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**DEPARTMENT OF MINES AND RESOURCES**

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**NATIONAL MUSEUM OF CANADA**

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**BULLETIN No. 88**

**BIOLOGICAL SERIES No. 23**

**BOTANICAL INVESTIGATIONS IN  
BATCHAWANA BAY REGION,  
LAKE SUPERIOR**

**BY**

**R. C. Hosie**

**WITH**

**A Catalogue of the Vascular Plants, by T. M. C. Taylor**

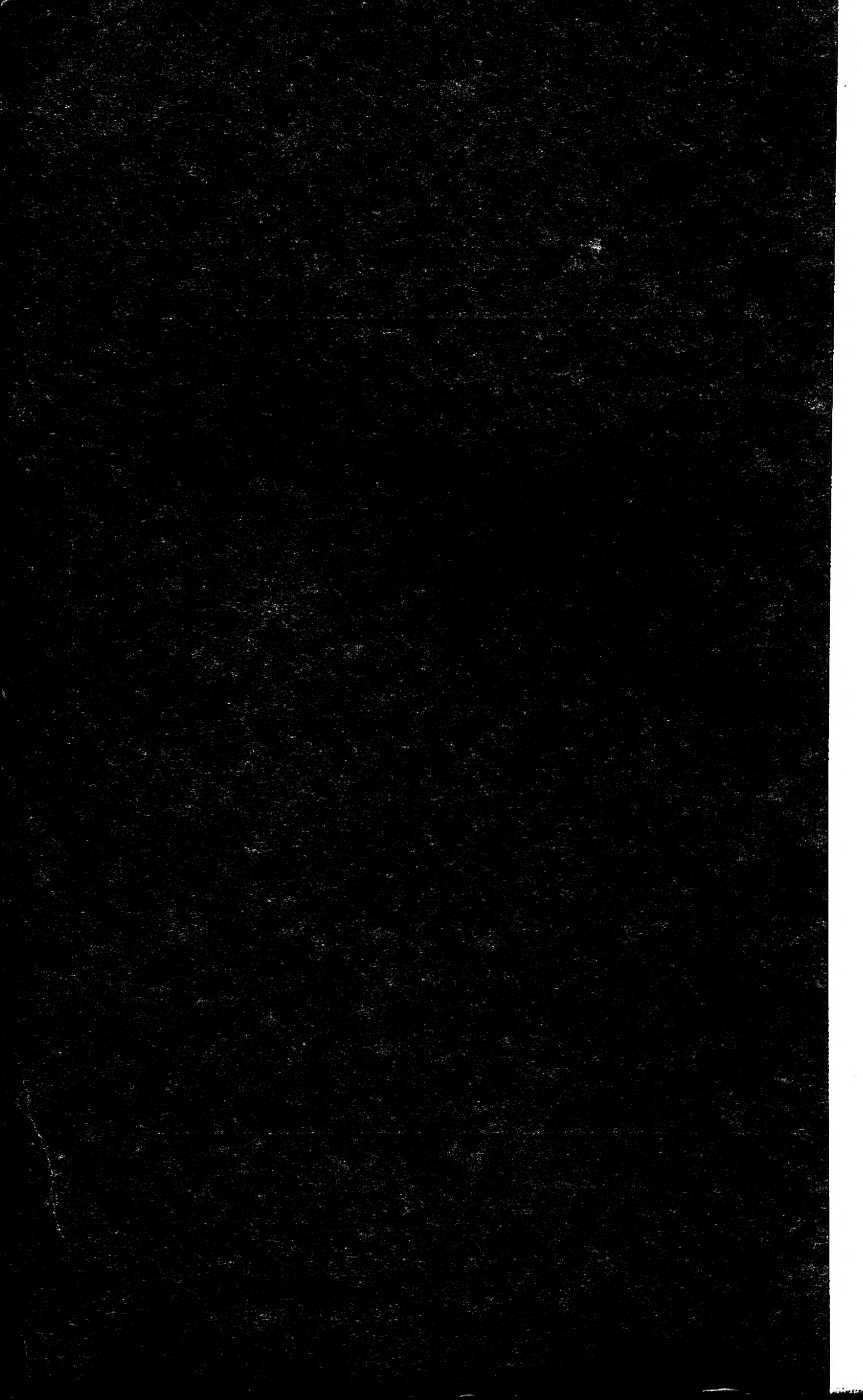
**AND**

**A Study of the Mammal Population, by C. H. D. Clarke**



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*Price, 50 cents*













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## PREFACE

This report covers the results of a study of the vegetation made in the vicinity of Batchawana bay, lake Superior, during the summer of 1935.

The area selected, situated in a region that affords an opportunity for collecting plants from a great variety of different habitats, was felt to be admirably suited for such a study. In addition, reliable information on the character of the vegetation of this section of Ontario is not available, no botanical studies of an intensive nature having previously been made.

The purpose of the study was to obtain records and collections of flowering plants for the National Museum of Canada, and in addition to gather in so far as it was possible other information relating to habitat, ecological relations, and economic considerations.

Appreciation must be expressed to the officials of the Ontario Forestry Branch who assisted very materially in matters of transportation within the region, and to officials of the Ontario Department of Northern Development for allowing the field party to use road camps from which to carry on the field work. The usual difficulties of a field party collecting and preserving botanical specimens were thus largely eliminated and better progress in the field was made than would otherwise have been possible.

Acknowledgment must also be made to the members of the field party who were responsible for the collections made and who assisted in the gathering of the data. These included: Professor T. M. C. Taylor of the Department of Botany, University of Toronto, who in addition to supervising the collecting of plants assumed the responsibility for the determination of the species; Mr. A. P. Leslie, formerly of the research department of the Ontario Forestry Branch, who did all of the photography and was responsible for the examination of the soils; Mr. S. T. B. Losee, Class Assistant in the Department of Botany, University of Toronto, and Dr. R. E. Fitzpatrick now with the Dominion Department of Agriculture, assisted in gathering the ecological data and in plant collecting. Two zoologists, Dr. C. H. D. Clarke and Mr. H. P. Stovell, were also members of the party detailed to carry on zoological work.

The party assembled in Sault Ste. Marie on Wednesday, July 10, field work commencing on July 12, from the main camp established in a road camp at the junction of Pancake creek and the trans-Canada highway. Altogether ten weeks were spent in the field, field work ending on September 20.



## **BOTANICAL INVESTIGATIONS IN BATCHAWANA BAY REGION, LAKE SUPERIOR**

### **PHYSIOGRAPHY**

Moore (14)<sup>1</sup> describes the Batchawana area as being one of the most rugged in Ontario. Within its boundaries hills rise to an elevation of nearly 2,000 feet. Mamainse hill, one of the highest, rises 1,356 feet above the level of lake Superior and forms one of the finest lookout points in the entire area. It is readily reached by way of an old wagon road that runs north to Pancake lake from a point on the highway just west of Sable river. This hill, or Mamainse mountain as it is called locally, forms part of a prominent ridge of hills that lie approximately 7 miles north of the Lake Superior shore-line. These hills form a very rugged and uneven topography, presenting many steep hill-sides and escarpments of naked rock, particularly on the south and eastern exposures.

The westerly part of the area that forms the east shore of lake Superior is also very rugged, the shore-line being extremely irregular there with many small rocky islands, separated from it in many cases by only a few feet of water. This section of the lake is very dangerous and unsafe for canoes.

The central southern part of the area is relatively flat, or at most of a slightly rolling nature. Here there are large swamps inland and long stretches of sandy beaches along the shore.

Batchawana river forms the major drainage, entering lake Superior just opposite the widest part of Batchawana island. Harmony or Chippewa (local name) river is the second largest stream, and in addition there are a number of smaller ones, particularly Sable or Carp and Pancake rivers, but on the whole the streams in the area are not impressive and most of them are not navigable by canoes for any appreciable distance except during high water.

Several small lakes or pond-like bodies of water occur. Mamainse lake or Smith lake is perhaps the most important of these, and lies in the interior hilly country at the foot of Mamainse hill. Carp lake is situated in the lowlands and except for a short part of the shore-line on the north side is surrounded by low, marshy ground mainly occupied by a cedar bog forest. Both of these lakes drain into Sable river. The other lakes are of small size, most of them only ponds scattered rather uniformly over the area.

### **GEOLOGY AND SOILS**

The geology of the district of Algoma has been studied by E. S. Moore (14), from whose work the following brief account is taken.

The oldest rocks, designated the Batchawana series, are composed of acid and basic lavas, interbedded with arkose, greywacke, and iron formation. In its distribution this formation is restricted to the central part of the area, where remnants of it may be seen just north of Carp lake.

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<sup>1</sup> Numbers refer to "References cited," p. 64.

The second oldest rocks form Mamainse hill and several adjacent hills extending north throughout Palmer township. This formation, known as the Mamainse diabase, is thus a prominent feature of the area, and it was interesting to note that the talus formations at the bases of many of these hills offered fruitful areas for plant collecting and supplied some species not found in any abundance elsewhere in the area.

Granite of the Algoman series lies principally north of Harmony bay, but occurs again at Mica bay from where it extends to the north. It is mostly the biotite type, grading into rocks carrying more hornblende or pyroxene than biotite.

The easterly part of the area is composed of a thick series of sediments and lavas dipping towards the Lake Superior basin. The formation known as the Keweenawan system comprises rocks of diabase grading into gabbro and in many places indistinguishable from the Mamainse diabase. In addition there are great thicknesses of sediment, chiefly conglomerate, sandstones, shale, and marl, much of it now concealed by glacial drift and stratified sand and gravel.

The southern part of the area, including practically all of Batchawana island, is now overlain with stratified gravel, sand, and clay, the deposits of Pleistocene time.

The soils that now cover the area vary considerably in texture, structure, and mineral composition, and undoubtedly they exert an influence on the distribution of the plant species. There are on the lowlands, and on much of Batchawana island, the fine clay and silt sediments that were laid down by the waters of Lake Algonquin, the great lake that occupied the Lake Superior basin after the retreat of the ice. There are the sands and stratified gravels, also laid down in Lake Algonquin time, that in places are still being water washed and moved about. This is particularly noticeable along much of the Lake Superior shore-line, along some of the river banks, and on Batchawana island where small dunes or ridges form, covering over previously established vegetation but attracting certain other species of plants and animals. In the hilly country to the north the soils are largely composed of glacial till. Here the uneven topography creates a variability in the drainage and soil depth. Some areas in the rougher parts are bare of soil altogether except for occasional small pockets of glacial till or irregular mats of humus, and over a great part of the area, particularly in the easterly part, the soils are thin and rocky and support mainly drought-resisting species.

The glacial till, which is the most widespread soil in the area, is a rather brownish to dark-coloured loam, intermingled with pebbles, stones, and varying quantities of organic matter. Much of it is good agricultural land, but the topography is such that suitable areas for cultivating are infrequent and of small extent.

The outcrops of clay-silt soil, especially where they contain organic matter, have the texture of good agricultural land. On drying they crumb up well. They are, however, situated usually in the lowermost parts of the area where drainage is poor. In addition, this deposit is frequently covered over with sand which drifts readily on the removal of the vegetative cover.



CLIMATE

In Table I temperature normals are given for Steep Hill Falls and Sault Ste. Marie. The former is situated on Magpie river near Helen mine, and is approximately 70 miles north of the centre of the area investigated. Sault Ste. Marie is 55 miles by road from Batchawana village, and thus lies approximately 40 miles south of the centre of the area. The Weather Bureau has kept temperature records at each of these places over a period exceeding twenty years. Temperature normals for the American Soo (12), situated just across the river from the Canadian Soo, are included in the table, as the records from there are averages of a thirty-three year period.

In Tables II, III, and IV, humidity, sunshine, and frost data are given for the American Soo and precipitation normals are given in Table V for a number of places north, east, and south of Batchawana village.

Although the figures in these tables are not directly applicable they are indicative of the general climate for this section of Ontario, and are probably as suitable for the present purpose as would be records from within the area if such were available.

TABLE I

*Temperature Normals at Steep Hill Falls, Sault Ste. Marie, Ontario, and Sault Ste. Marie, Michigan,<sup>1</sup> Respectively*

—	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
DEGREES FAHRENHEIT													
Mean temperature.....	4.5	6	15.5	32.5	49.5	57.5	60.5	58.5	52	41	26	13	34.7
Maximum temperature...	17	19	29	45	58	69	70	69	62	49	33	23	45.2
Minimum temperature...	−8	−7	2	20	41	46	50	48	42	33	19	3	24.8
Mean temperature.....	15	12	21.5	38.5	49.5	59	63.5	62	55.5	44.5	31.5	20.5	39.4
Maximum temperature...	22	22	31	48	59	70	74	71	64	51	37	27	48.0
Minimum temperature...	8	2	12	29	40	48	53	53	47	38	26	14	30.8
Mean temperature.....	14	11.9	22.6	37.7	48.8	58.7	63.3	62.0	55.8	44.9	32.4	20.8	39.4
Maximum temperature...	21.7	20.6	31.5	46.2	58.6	69.7	73.7	71.2	64.3	52.0	37.8	27.0	47.9
Minimum temperature...	6.3	3.2	13.6	29.2	39.0	47.7	52.9	52.8	47.2	37.8	27.0	14.7	31.0

<sup>1</sup> Based on a thirty-three year record of the U.S. Weather Bureau.

TABLE II

*Mean Relative Humidity at Sault Ste. Marie, Michigan*  
(Average of thirty-three years)

—	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
8 a.m.....	86	86	84	79	77	80	84	86	88	87	85	85	84
8 p.m.....	85	83	77	70	67	68	71	76	80	80	82	83	77

TABLE III  
*Per Cent of Possible Sunshine at Sault Ste. Marie, Michigan*  
(Average of thirty-three years)

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
28	46	52	52	53	59	61	54	45	35	19	23	44

TABLE IV  
*Frost Data, Sault Ste. Marie, Michigan*  
(Based on thirty-three years' records)

Average date of last killing frost in spring	Average date of first killing frost in autumn	Latest date of killing frost in spring	Earliest date of killing frost in autumn
May 15	Sept. 28	May 29	Sept. 5

TABLE V  
*Precipitation Normals at Seven Places Bordering Batchawana Bay Area*

—	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
---	------	------	------	-------	-----	------	------	------	-------	------	------	------	------

SAULT STE. MARIE, ONTARIO

Rain.....	0.39	T	0.02	2.06	2.82	3.50	3.34	2.38	3.53	3.17	1.84	0.53	23.58
Snow.....	25.5	16.7	5.7	2.2	1.2	.....	.....	.....	.....	0.1	9.9	36.5	97.8
Total precipitation...	2.94	1.67	0.59	2.28	2.94	3.5	3.34	2.38	3.53	3.18	2.83	4.18	33.36

SAULT STE. MARIE, MICHIGAN

Rain.....	1.9	1.45	1.82	2.25	2.89	2.74	2.62	2.97	3.39	3.14	2.89	2.21	30.27
Snow.....	16.6	11.7	8.5	2.6	0.6	.....	.....	.....	T	1.7	12.0	16.5	70.2
Total precipitation...	3.6	2.65	2.7	2.5	2.95	2.74	2.62	2.97	3.39	3.31	4.09	3.86	37.29

BLIND RIVER (90 MILES SOUTHEAST SAULT STE. MARIE)

Rain.....	0.24	0.22	1.49	2.16	2.67	3.8	2.93	1.59	3.24	3.91	2.21	0.62	25.08
Snow.....	20.8	15.3	11.0	4.9	0.7	.....	.....	.....	T	0.6	6.9	12.2	72.4
Total precipitation...	2.32	1.75	2.59	2.65	2.74	3.8	2.93	1.59	3.24	3.97	2.9	1.84	32.32

## BRUCE MINES (60 MILES SOUTHEAST SAULT STE. MARIE)

Rain.....	0.4	0.56	1.09	2.1	2.83	2.78	3.34	2.84	3.17	2.85	1.74	0.53	24.23
Snow.....	16.3	14.7	16.3	3.9	0.3	.....	.....	.....	.....	0.4	9.6	17.9	79.4
Total precipitation...	2.03	2.03	2.72	2.49	2.86	2.78	3.34	2.84	3.17	2.89	2.7	2.32	32.17

## MICHIPICOTEN FALLS (100 MILES NORTH SAULT STE. MARIE)

Rain.....	0.1	0.05	0.94	1.1	2.48	3.02	3.71	2.5	4.28	2.98	1.28	0.35	22.79
Snow.....	32.0	18.0	14.2	8.6	0.9	T	.....	.....	0.1	2.4	15.2	38.5	129.9
Total precipitation...	3.3	1.85	2.36	1.96	2.57	3.02	3.71	2.5	4.29	3.22	2.8	4.2	35.78

## STEEP HILL FALLS

Rain.....	0.13	0.07	0.85	1.48	2.49	2.78	3.33	3.46	4.47	0.98	1.64	0.51	22.19
Snow.....	34.1	24.0	18.1	5.4	1.5	.....	.....	.....	.....	4.4	15.1	34.4	137.0
Total precipitation...	3.54	2.47	2.66	2.02	2.64	2.78	3.33	3.46	4.47	1.42	3.15	3.95	35.89

## CHAPLEAU (80 MILES NORTHEAST BATCHAWANA VILLAGE)

Rain.....	T	0.04	0.22	0.93	1.96	3.34	3.00	2.74	3.29	2.36	1.1	0.24	19.22
Snow.....	18.5	11.4	15.3	8.1	3.4	T	.....	.....	0.2	4.8	12.5	16.5	90.7
Total precipitation...	1.85	1.18	1.75	1.74	2.3	3.34	3.00	2.74	3.31	2.84	2.35	1.89	28.29

During six months of the year the mean monthly minimum is less than 32 degrees and above 45 degrees for only three months. The winters are, therefore, long and cold. Spring frosts are not usual after May 15 and damaging frosts not until after September 15. The summers are thus comparatively short, with a growing season of approximately one hundred to one hundred and twenty-five days, probably a little longer than this near the lake shore because of the equable temperature of Lake Superior water.

Fogs frequently roll in from the lake, particularly in the early mornings and evenings, during the growing season, and probably partly account for the rather high relative humidity normals given. These figures although included add little to our knowledge of the atmospheric humidity.

From the figures of precipitation normals it will be seen that there is an average precipitation of 32 to 36 inches, a large part of which falls during the growing season. Snowfall is heavy, particularly along the east shore of lake Superior where it is over 125 inches. It may also be noted that the precipitation is well distributed throughout the year, the probability of droughts being, therefore, lessened.

## TERMINOLOGY

In that this study is concerned primarily with groupings of plants, such terms as plant community, stand, association, formation, and others may occur. It seems desirable, therefore, for purposes of clarity, to state the concept under which various terms are used.

The term plant community is used to give expression to any grouping of plant forms having a homogeneous area and thus showing distinct individuality. The term association is used in both the abstract and the concrete sense as suggested by Nichols (16). Generally, however, when considering a concrete association the term stand has been used. This is in agreement with various European ecologists (Braun-Blanquet, 5). The term stand has, in addition, been used by foresters and ecologists on this continent in essentially the same sense with reference to forests (Brodie, 7). When a stand or a plant community deviates from the general composition of the association in question it has been termed a facies, following Braun-Blanquet. The larger vegetative units such as meadow, hardwood forest, or evergreen forest are termed formations by most ecologists, and in this sense the term formation will be used; it is a physiognomic unit, recognized through its appearance rather than through the composition of the plants. The term forest is used in a very general sense, but the context will reveal whether reference is made to a stand, a forest community, or other natural plant grouping.

Within each formation, for example the forest formation of the region, there are then a number of stands, which are forest communities. Many of these stands resemble one another so closely in their composition that they are said to belong to the same association. Others that differ in their composition are referred to one or more other associations. The association then is composed of one or more stands and any one of the stands may be taken as an example of that particular association. An association in the abstract sense is, therefore, usually a much larger and more variable structure than is the association in the concrete. It has been determined from the stands studied. The completeness of its description depends on the inclusion of all the stands representative of that association. Just as it is impossible to see and describe all the individuals of a species, so also is it impossible to study all the examples of an association. The association description can, therefore, never be complete, and the term as thus used becomes then simply a means of referring to units of vegetation without the necessity of completely describing them.

In the determination of the composition of the lower vegetation of the stands the abundance of the species occurring, their cover degree, and their sociability have been determined usually from selected plots, all 25 feet square. In some instances the determinations were made by ocular

estimation by running lines through the stand or while searching within a community for suitable plants to collect. The following grades (Braun-Blanquet) have been used.

#### *Scale for Abundance and Cover Degree*

- + = Sparsely or very sparsely present; cover very small.
- 1 = Plentiful, but of small cover value.
- 2 = Very numerous, or covering at least one-twentieth of the area.
- 3 = Any number of individuals covering one-quarter to one-half the area.
- 4 = Any number of individuals covering one-half to three-quarters of the area.
- 5 = Covering more than three-quarters of the area.

#### *Scale of Sociability*

- Soc. 1 = Growing singly, one plant in a place.
- Soc. 2 = Grouped or tufted.
- Soc. 3 = In troops, small patches, or cushions.
- Soc. 4 = In small colonies, in extensive patches or forming carpets.
- Soc. 5 = In great crowds (pure populations).

In the stand descriptions the species are grouped under the following life forms: trees, shrubs, herbs, mosses. Within the groups of shrubs and herbs the specific name is preceded by the figure for abundance and cover and the sociability figure. Thus, "4·1 *Smilacina racemosa*" means that this species covers one-half to three-quarters of the area, appearing as single plants. Its abundance is not given, but may be deduced from one's knowledge of the relative size of the plants.

The sequence of the plants in the various lists, which occur throughout the stand descriptions, follows quite closely that in the catalogue of plants, page 66, and so far as possible the same nomenclature has been used. Mosses are named from Grout's "Mosses with Hand-lens and Microscope."

In addition to classifying the vegetation into plant groups the usual desire of the investigator is to relate each plant community to its proper sere, that is to place it with reference to time by locating it as a stage in the successional series which leads towards a climax. When this is done a key can be constructed that enables the reader to picture the probable future of any given piece of vegetation while at the same time the stages through which it has developed may be visualized. When one considers the great complexity of the factors involved in the changes that are taking place in the vegetation of any region it must be apparent that a correct interpretation of what has gone before or of what will in the future result is a slow and difficult undertaking. Observations of succession taking place have been made and certain small sections of the area were studied for the purpose of determining the relationships of certain plant groupings, but on the basis of ten weeks' field work it has been found possible to include only a very superficial account of the hydrosere and of the xerosere. The terms that have been used in describing the succession require no explanation, being in agreement with general usage (e.g., Braun-Blanquet and Clements).



## TYPES OF VEGETATION

The area bordering Batchawana bay (Figure 1) lies within the transition forest region that separates the coniferous forest formation of northern Canada, consisting mainly of white and black spruce, balsam fir, and paper birch, from the deciduous forest formation, which according to Nichols (15) shows its most typical development in the lower Ohio basin and the southern Appalachians and is characterized by beech, sugar maple, yellow birch, basswood, red oak, white elm, ironwood, and other more southerly trees. This region, lying between two great forest formations, occupies approximately the drainage systems of the Great Lakes and the St. Lawrence river, and the forest covering it is sometimes spoken of as the great northern hardwoods forest. Due to variations in topography, climatic differences, and other factors there are within the area very variable conditions for forest growth. It is here that the ranges of southern and northern species overlap, the two seemingly finding conditions of growth which, if not entirely favourable, are at least such that they may grow side by side. Mixed stands of conifers and hardwoods are, therefore, general throughout, and the characteristic species of the area are more or less a combination of the less exacting species that give character to the two bordering formations.

Batchawana bay with the adjoining country is situated in the northeastern section of this transition forest, in what is recognized by Sharpe and Brodie (18) as the Algoma extension of the Ottawa-Huron region. One might expect, therefore, owing to the relatively short distance from the northern coniferous forest, that the stands would show a greater preponderance of conifers than is usual throughout the general range of the transition forest. The present stands, however, are to a large extent the result of interference due to logging operations, mining activities, agricultural and tourist development, road construction, and forest fires. The result is that the conifers have suffered much more than have the hardwoods and except in the remnants of the truly coniferous forest they are not nearly so plentiful as normally they should be. The deciduous species, therefore, predominate and the majority of the stands are now principally hardwoods, with only a sprinkling of conifers present. There are also large areas now occupied by stands that form the northern representatives of the deciduous forest formation, typified here by the sugar maple which may be said to be the dominant tree of the region. The forested country as a whole has thus a decidedly deciduous character which is only mildly removed from it towards the northeasterly part of the area where remnants of the northern forest intrude.

There are then, really three, more or less distinct formations to be considered, the deciduous forest, the transition forest, and the northern coniferous forest. Each will be described and stands representative of each given in so far as the season's field studies have made this possible.

In addition to the forest vegetation within the region there are various places that, due to certain physiographic factors, are of interest because of the usually distinct type of vegetation they support. The stream valleys, the talus slopes, the rocky shores, the roadsides, and

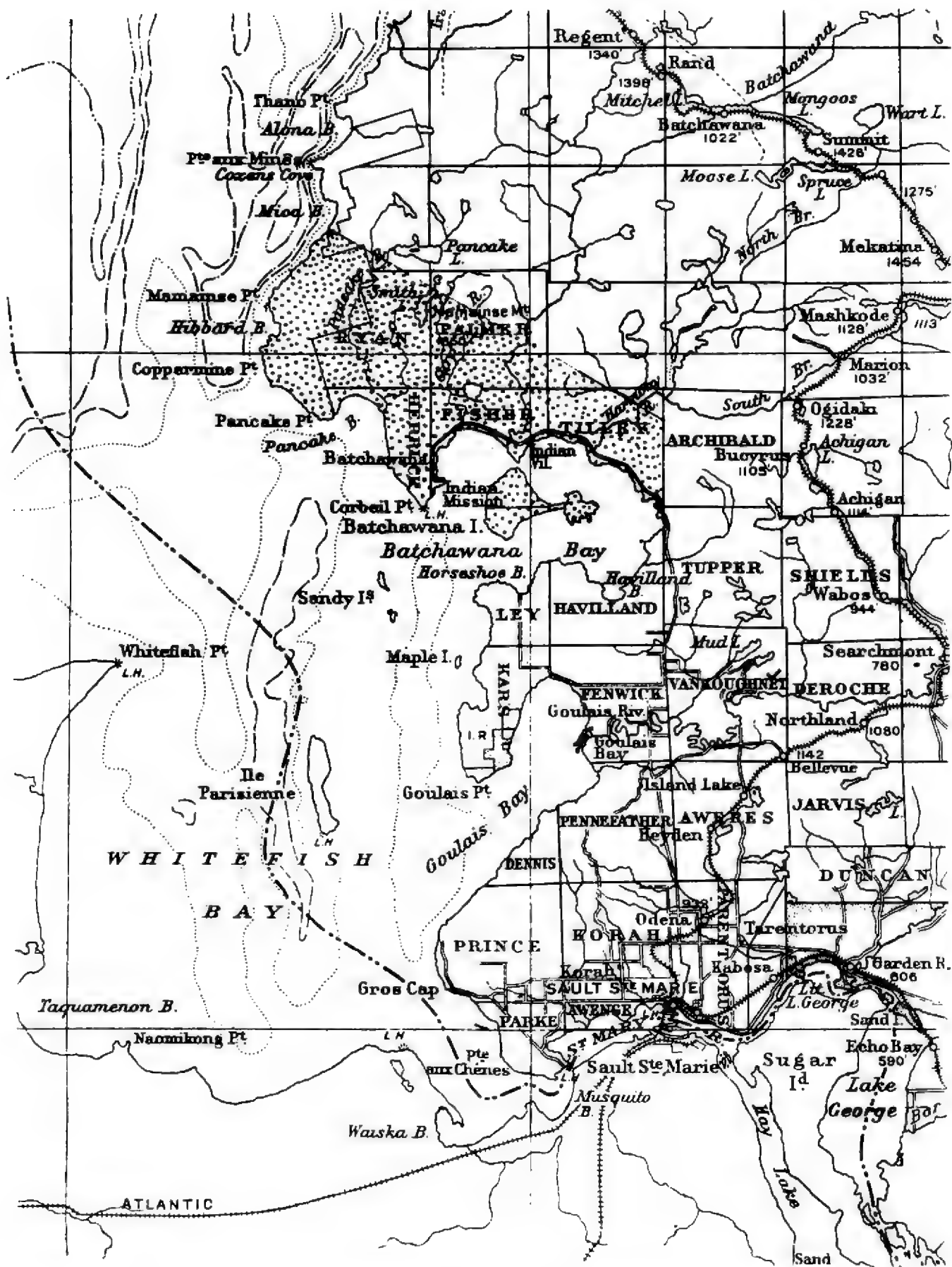


Figure 1. Map of Batchawana bay (area investigated in stippling).

other places offer fruitful fields for plant collecting, and although such places were visited mainly for the purpose of collecting material, notes were usually taken of any interesting features and certain of them are included in this report. These, with any descriptions of the vegetation that have not been included in the section dealing with succession, follow the discussions of the three main forests.

#### THE DECIDUOUS FOREST FORMATION

The individual stands that comprise this formation practically clothe the rolling hills and the more fertile soils of the lower slopes with a forest, which though exhibiting considerable variability in its composition is characterized by a preponderance of deciduous species; conifers occur usually as scattered individuals, only occasionally rising above the crown level of the hardwoods to add here and there some irregularity to an otherwise uniform canopy.

The tree species, with some remarks as to their floristic and ecological significance, that are responsible for the physiognomy of this forest, are given below:

*Acer saccharum* Marshall (sugar maple) is invariably present and is the predominant species, in many places forming pure stands of mature trees.

*Betula lutea* Michaux f. (yellow birch) is usually scattered throughout, rarely forming pure stands and much less predominant than sugar maple.

*Ostrya virginiana* (Miller) K. Koch (hornbeam) is infrequently scattered throughout the forest, but is rarely ever absent.

*Acer rubrum* Linnaeus (red maple) in most places is only sparingly represented. It frequently associates with red oak on the southern exposures of higher hill-sides, as on Batchawana island and on the hill-sides north of Carp lake.

*Ulmus americana* Linnaeus (white elm) occurs very infrequently, usually on the better drained, lower lands.

*Fraxinus americana* Linnaeus (white ash) is practically confined to open, rocky slopes.

*Quercus borealis* Michaux f. and its variety *maxima* (Marshall) Ashe (red oak) is not widely distributed, but forms more or less pure stands on the southern slopes. In the main forest it is mostly absent.

*Betula papyrifera* Marshall (paper birch) is very scattered, but is usually present in the forest, though seldom conspicuous.

*Pinus Strobus* Linnaeus (white pine) is now practically only found on the steep, rocky hill-sides, where in many places it forms a conspicuous evergreen aspect. Logging operations have greatly depleted this species.

*Picea glauca* (Moench) Voss (white spruce) is seldom in any quantity, occurring as a widely scattered tree.

*Picea mariana* (Miller) B.S.P. (black spruce) is represented by infrequent specimens confined to the lower levels.

*Tsuga canadensis* (L.) Carrière (hemlock) was not found west of Sand point, and occurs only as a scattered tree. No pure hemlock stands were found, although a large quantity of hemlock has been recently removed from Batchawana island. The preponderance of stumps occurring indicates the presence of a greater percentage in the previous forest.

*Thuja occidentalis* Linnaeus (white cedar) occurs infrequently as a widely scattered member.

*Abies balsamea* (L.) Miller (balsam fir) occurs sparingly and was seldom found over 10 inches in diameter breast height.



79797

Figure 2. Interior of sugar maple stand.

The forest is usually characterized by having no very definite stratum of undergrowth. Trees of all sizes in diameter up to approximately 30 inches occur in the different stands, and the heights of those beneath the general crown level are very variable. The result is that the interior of the stand has a very luxuriant foliage aspect (Figure 2). Of the smaller trees and high shrubs, *Acer spicatum* Lamarck (mountain maple), *A. pennsylvanicum* Linnaeus (striped maple), and *Corylus rostrata* Aiton (hazelnut) are the most frequently found. Such other lower shrubs as *Lonicera canadensis* Marshall (American fly honeysuckle) and *Ribes*



*Cynosbati*<sup>1</sup> Linnaeus (prickly gooseberry) are as a rule always present. A few shrubs, particularly *Taxus canadensis* Marshall (ground hemlock) or *Sambucus pubens* Michaux (red elderberry) may in places occupy the ground surface, practically excluding all other lower vegetation, but are not general throughout.

The following is a list of the species that occur rather generally throughout the forest and that may be considered as characterizing the lower vegetation:

<i>Botrychium virginianum</i>	<i>Polygonatum pubescens</i>
<i>Thelypteris marginalis</i>	<i>Trillium cernuum</i>
<i>T. noveboracensis</i>	<i>Habenaria orbiculata</i>
<i>T. spinulosa</i> var. <i>intermedia</i>	<i>Actaea alba</i>
<i>Adiantum pedatum</i>	<i>Hepatica americana</i>
<i>Lycopodium lucidulum</i>	<i>Thalictrum polygamum</i>
<i>Cinna latifolia</i>	<i>Sanguinaria canadensis</i>
<i>Brachyelytrum erectum</i>	<i>Viola pubescens</i> var. <i>Peckii</i>
<i>Milium effusum</i>	<i>V. renifolia</i> var. <i>Brainerdii</i>
<i>Oryzopsis asperifolia</i>	<i>Aralia nudicaulis</i>
<i>Carex blanda</i>	<i>A. racemosa</i>
<i>C. communis</i>	<i>Osmorhiza Claytonii</i>
<i>C. intumescens</i>	<i>Trientalis borealis</i>
<i>Smilacina racemosa</i>	<i>Conopholis americana</i>
<i>Maianthemum canadense</i>	<i>Galium triflorum</i>
<i>Streptopus roseus</i>	<i>Mitchella repens</i>

The ground surface is practically free of cryptogams, only infrequently do small tufts or patches of moss occur and then generally only on exposed tree roots, decaying logs, or rock surfaces; lichens also are sparse and ferns are seldom conspicuous among the other plants, although in a few places they practically dominate very small areas. The lower plant forms are not, therefore, an outstanding feature of the general vegetation.

Grasses and sedges are comparatively infrequent. Indeed it can readily be said that no one type of vegetation is outstandingly conspicuous, unless one includes the tree seedlings which are generally very abundant, in many places obscuring the real character of the herbaceous aspect.

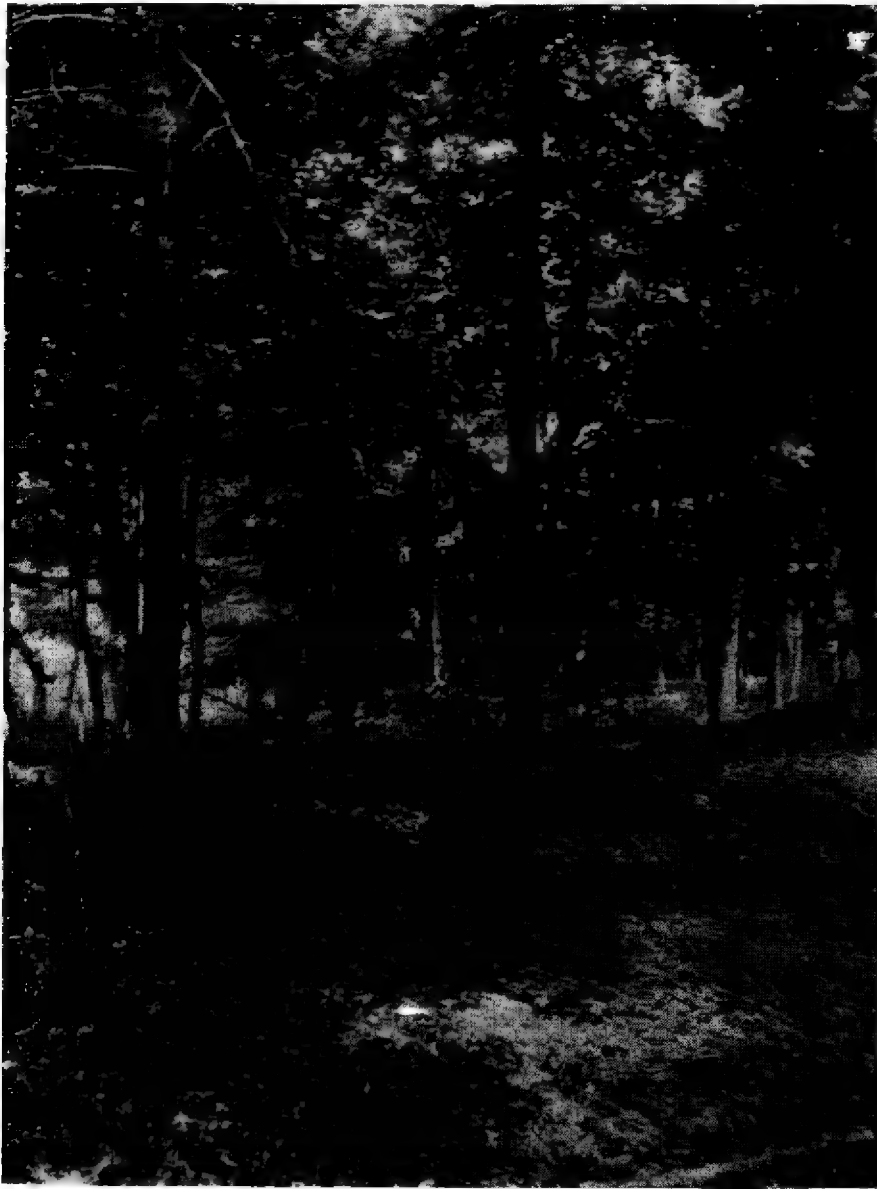
In a general way this northerly example of the deciduous forest formation agrees with the main visible features of the formation throughout its range south and east from Batchawana. There is, however, a noteworthy reduction in the number of character-giving tree species. Of these, beech (*Fagus grandifolia* Ehrhart), which in the far south is perhaps the most predominant species, does not occur. Basswood (*Tilia glabra* Ventenat), also an important constituent farther south, is absent. These two species occur commonly in the Ottawa-Huron region, but drop out of this formation in the vicinity of Sault Ste. Marie. To these may be added a long list of southern species that do not occur north of old Ontario.

The difference noted for the trees may be detected to some extent also in the composition of the lower forms of vegetation, but partly because of an inadequate knowledge of the herbaceous composition in areas farther south and doubtless because of the appearance that results from the preponderance of maple seedlings, the difference is not so apparent. Several

<sup>1</sup> This species was not collected and as all of the plants observed in the field lacked flowers and fruits much or all of it may be *Ribes oxycanthoides* L.



species common in this formation south of Algonquin Park area are absent in Algoma, or if they occur do so very sparingly. Such species as *Medeola virginiana* L., *Trillium grandiflorum* (Michx.) Salisb., *Oakesia sessilifolia* (L.) Wats., and *Dicentra Cucullaria* (L.) Bernh. were not found. The absence of these, and doubtless others, does not, however, alter the general physiognomy, which is strikingly similar to examples of the formation seen elsewhere in Ontario.



79803

Figure 3. Interior of red oak stand, mainly sugar maple seedlings on the ground.

The abundance of deciduous tree seedlings, and the prevalence of young deciduous trees representing practically all age classes, suggest that the deciduous element of this forest is able to perpetuate itself. Sugar maple seedlings far outnumber all others, and are apparently not confined to any particularly favoured spots within the forest (Figure 3). Yellow birch seedlings on the other hand are practically confined to small areas on which woody material has decayed; seedlings of this species were not

found anywhere on mineral soil. An examination of older trees and established young growth supports the contention that the reproduction of yellow birch is dependent, at least in the northern hardwood forest, on a suitable substratum of decomposed wood (Figures 4, 5, and 6). Red maple and hornbeam reproduction occurs usually wherever there are seed trees, but not abundantly; thus there is an infrequent scattering of tree seedlings and young trees of these two species throughout the forest. Young growth of red oak occurs only locally, and even when found is far outnumbered by the maples. Seedlings of paper birch were not found, and young trees occur only in the very open parts of the mature forest.



79808

Figure 4. Exposed roots of yellow birch are common throughout the region, indicating that in early life these trees started growth with their roots above the ground level. The remains of an old stump can in many places be seen beneath these exposed roots.

The coniferous trees are definitely less prominent than are the hardwoods, and in this forest it can scarcely be said that this is due to man's interference. Young coniferous growth is very infrequent, and conifer seedlings are rare. In places where mature hemlock occurs seedlings and young hemlock trees are usually found, though not occurring in any abundance. White pine reproduction occurs only in the very open places, and rarely were young white pine trees found. Balsam seedlings and young growth are sometimes abundant locally, but apparently few of them ever mature, because medium-sized trees are very infrequent. White cedar seedlings are seldom present in the forest.

Studies were made in several stands of this forest formation, the results of which formed the basis for the forest association descriptions that follow.



79902

Figure 5. Yellow birch reproduction bordering an old haul road. This haul road was cut through some forty years ago. The slash thrown to each side of it decayed and provided the seed bed on which the yellow birch was able to germinate.



79901

Figure 6. Young yellow birch tree which germinated on top of a partly decayed pine log. The roots of the yellow birch have extended into the mineral soil, but the pine log is still supporting the tree.

*Sugar Maple-Yellow Birch Forest*

<i>Acer saccharum</i>	<i>Trees</i>	<i>Betula lutea</i>
<i>Ostrya virginiana</i>		
	<i>Shrubs</i>	
1·1 <i>Lonicera canadensis</i>		2·2 <i>Acer spicatum</i>
+·1 <i>Ribes Cynosbati</i>		
	<i>Herbs</i>	
1·1 <i>Polygonatum pubescens</i>		+·2 <i>Galium triflorum</i>
1·1 <i>Streptopus roseus</i>		1·1 <i>Viola pubescens</i> var. <i>Peckii</i>
1·1 <i>Smilacina racemosa</i>		+·2 <i>Milium effusum</i>
1·1 <i>Thelypteris spinulosa</i> var. <i>inter-</i>		+·2 <i>Carex intumescens</i>
<i>media</i>		1·3 <i>Mitchella repens</i>
1·1 <i>Trillium cernuum</i>		

Areas studied: (1) uplands south of Mamainse mountain; (2) east of Batchawana river, below the first falls; (3) on the main highway 2 miles west of Harmony river; (4) Batchawana island; (5) east and south of Gimlet creek.

Sugar maple and yellow birch are the dominant trees with sugar maple by far the most abundant, in many places appearing to compose the entire stand. Yellow birch rarely occupies such a prominent position, being usually rather infrequently scattered throughout. One other tree, hornbeam, although seldom conspicuous and much less frequent than yellow birch, is rarely ever absent and deserves inclusion as a characteristic species of the association.

With the exception of hornbeam, which is usually under 10 inches in diameter, the trees occur in all sizes up to 30 inches diameter breast high, and in all ages up to a hundred and fifty years. The stand, therefore, has an irregular but luxuriant interior appearance (Figure 2). Other hardwood species and some conifers may occasionally occur to add to this irregularity. Of these, perhaps red maple is the most usual, but such trees as white elm, white ash, white spruce, white pine, hemlock, and balsam fir may be encountered.

The herbaceous and shrub layers so characteristic of a coniferous forest are lost here in a maze of young maple growth which practically covers the ground surface, giving one the impression of a practically pure ground cover of maple reproduction extending vertically into the very irregular crown level of the dominant trees. So dense is this maple reproduction that other shrubs and herbaceous plants are discovered only after careful searching. Among the shrubs, in addition to the primary ones, may occur: *Acer pennsylvanicum*, *Corylus rostrata*, *Cornus alternifolia*, *Sambucus pubens*, *Taxus canadensis*, *Prunus virginiana*, and others.

The secondary herbs include:

<i>Botrychium virginianum</i>	<i>Osmorhiza Claytonii</i>
<i>Thelypteris Dryopteris</i>	<i>Carex blanda</i>
<i>T. marginalis</i>	<i>Actaea alba</i>
<i>Adiantum pedatum</i>	<i>A. rubra</i>
<i>Lycopodium annotinum</i>	<i>Caulophyllum thalictroides</i>
<i>Brachyelytrum erectum</i>	<i>Aralia nudicaulis</i>

Herbaceous plants, however, are nowhere abundant, being found usually as single widely spaced specimens, in many places hidden from view by the foliage of shrubs or trees.



Several stands composed of sugar maple only occur within the region and here there is little other than seedlings of sugar maple covering the ground surface. In many places these seedlings are only a few inches high, of very uniform height and spacing, their density apparently preventing other vegetation from occurring.

Wherever a small opening in the canopy occurs within this association those little trees that are favourably situated begin height growth, and eventually one or more of them, depending on the size of the opening, will gradually close up the canopy, thus maintaining a very shaded interior to the stand. It seems, therefore, beyond doubt that sugar maple, which is the most abundant tree seedling, will continue as the prominent tree of the association, yellow birch, hornbeam, and its other associates maintaining a less prominent position.

### Red Oak Forest

#### Trees

*Quercus borealis* var. *maxima*  
*Acer saccharum*  
*Betula lutea*

*Pinus Strobus*  
*Acer rubrum*

#### Shrubs

+·1 *Sambucus pubens*  
1·2 *Rubus Idaeus* var. *strigosus*  
+·1 *Acer pennsylvanicum*

+·1 *Lonicera canadensis*  
+·1 *Amelanchier laevis*  
+·1 *Prunus pennsylvanica*

#### Herbs

+·1 *Thelypteris spinulosa* var. *intermedia*  
+·1 *Streptopus roseus*  
+·2 *Carex intumescens*  
+·2 *C. blanda*

+·1 *Lycopodium obscurum*  
+·1 *Aralia nudicaulis*  
+·1 *Trientalis borealis*  
+·2 *Brachyelytrum erectum*

#### Mosses

+·3 *Polytrichum commune* L.

+·3 *P. juniperinum* Willd.

Areas examined: (1) south slopes of hills north of Carp lake; (2) Batchawana island; (3) area between Sand point and the highway.

Red oak is the dominant tree; two forms of it occur. The species *Quercus borealis* is a rare tree, only one authentic specimen being found and that on Batchawana island; the common red oak of all the stands examined is *Q. borealis* var. *maxima*.

The oak trees form the main stand, in places being practically the only larger trees. Sugar maple and red maple are the most common associates, with only an occasional white pine, white cedar, yellow birch, white ash, or white elm.

In the stands examined the oldest trees were approximately one hundred and forty years of age, 70 to 80 feet high, and up to 20 inches in diameter at breast height. The majority of the larger trees are of good form, with approximately 40 feet of clear, straight trunk, exhibiting much better shape than is common for the maples (Figure 3).

The sparse undergrowth that exists is largely composed of widely scattered young maple trees of varying sizes and ages, with shrubs being very infrequent. Very few small oak trees are to be found, the openings in the stand being in most cases filled by sugar maple.

The ground surface is covered with seedlings, mainly of sugar maple interspersed with frequent red oaks. Herbaceous plants occur only infrequently and are rarely of normal size. The dense shade cast by the leaves of the oak trees doubtless accounts for the paucity of ground vegetation.

Red oak stands are not general throughout the region, only fragmentary stands being found; in addition the red oak is not a prominent tree in the deciduous forest.

### *Yellow Birch-White Cedar-Hemlock Forest*

#### *Trees*

*Betula lutea*  
*Thuja occidentalis*  
*Tsuga canadensis*  
*Acer rubrum*

*Pinus Strobus*  
*Abies balsamea*  
*Acer saccharum*  
*Picea glauca*

#### *Shrubs*

+·1 *Acer spicatum*  
+·1 *Prunus pennsylvanica*  
+·3 *Rubus Idaeus* var. *strigosus*  
+·1 *Acer pennsylvanicum*

+·1 *Sorbus americana*  
+·1 *Lonicera canadensis*  
+·1 *Sambucus pubens*

#### *Herbs*

1·1 *Thelypteris spinulosa*  
1·2 *Trientalis borealis*  
1·3 *Cornus canadensis*  
+·1 *Clintonia borealis*  
+·1 *Maianthemum canadense*  
+·2 *Carex intumescens*

+·2 *Lycopodium lucidulum*  
+·1 *Streptopus roseus*  
1·3 *Oxalis montana*  
1·3 *Coptis groenlandica*  
1·3 *Viola renifolia*

#### *Mosses*

*Dicranum undulatum* Ehrh.  
*Polytrichum commune* L.

*Polytrichum juniperinum* Willd.

Areas studied: (1) Batchawana island; (2) highway near Harmony river.

Yellow birch is the dominant tree and occurs in all sizes up to 2 feet in diameter breast high and 70 feet in height. Sugar maple is much less common, but also occurs in all sizes up to 1 foot in diameter. White cedar occurs scattered throughout, as does also hemlock; occasional very large trees of each occurring. Balsam fir, red maple, white spruce, and white pine are small trees, usually infrequently occurring only in the undergrowth, associating with infrequent shrubs.

The trees are all of poor form with many limbs, and mostly of poor height growth. The ground vegetation is, however, much more abundant than is the case in the two previously described stands. There is further a larger proportion of the herbaceous species commonly found in coniferous woods, an indication of a condition less favourable to hardwood species.

Of the two stands examined in the region, the one situated on Batchawana island has been logged over some years ago for hemlock and white pine and the decaying of the slash from this cutting has made suitable seed beds for yellow birch. Figure 5 illustrates the abundant yellow



birch young growth that has come up on the two sides of a road that was cut through the bush, the trees now occupying principally the areas bordering the road that were slash covered. The slash left in the cut-over forest having escaped fire accounts for the prevalence of yellow birch in the main stand.

The stand on the highway near Harmony river has developed without the aid of a previous cutting. Here it would seem that the destructive agent to the previous stand was wind. Windfalls are still a characteristic feature and the prevalence of young yellow birch growth in and around decaying windfalls doubtless accounts for the prominent position held by this tree in the composition of the stand.

#### THE TRANSITION FOREST OF THE REGION

This is the type of woodland that occupies such extensive areas in eastern Canada, where it is generally referred to as a fire type. In the Batchawana vicinity the type occurs only in small sections, the stands comprising it not being aggregated, but appearing as scattered patches of variable sizes. The forest as a whole is, therefore, not a conspicuous feature and is less prominent than is the combined effect of the deciduous stands and the southerly remnants of the coniferous forest. Nevertheless, from the economic point of view, such stands have a very great importance, as many of them are potential timberlands, if provided with proper management.

The stands begin to appear as one approaches the mouth of Batchawana river from the east and occupy portions of the land from here westward and north lying between the lake shore and the hills farther inland. These stands are all very variable in composition, which makes it difficult to generalize when attempting a description of the forest as a whole. Possibly a more detailed study would have enabled the inclusion of some stands into one or other of the two climatic formations, but in many instances it is doubtful whether further study would reveal what the future forest will be. In addition, the forest has characteristics that are definitely distinct from those of either of the two climatic formations.

The principal trees are combinations, in various proportions, of coniferous and deciduous species. The following are the most important:

*Acer saccharum* Marshall (sugar maple) is present in many places, but seldom conspicuous as a timber tree.

*Betula lutea* Michaux f. (yellow birch) is an occasional tree, some reaching fair sizes.

*Acer rubrum* Linnaeus (red maple) occurs as a small tree rather sparingly in the older stands, but frequently plentiful in young stands.

*Betula papyrifera* Marshall (paper birch) is usually present and may form almost pure stands.

*Pinus Strobus* Linnaeus (white pine) frequently occurs as a very large tree in the older stands, especially on rocky soil.

*Picea glauca* (Moench) Voss (white spruce) occurs as a scattered tree, many of good size.

*Tsuga canadensis* (L.) Carrière (hemlock) occurs very sparingly and is of poor form, most of this forest being beyond its range.

*Abies balsamea* (L.) Miller (balsam fir) is usually plentiful and many are of good size.

*Populus tremuloides* Michaux (trembling aspen) in many places forms almost pure stands, common in the young stands.

*P. tacamahacca* Miller (balsam poplar) is infrequent, but many are of large size.

*P. grandidentata* Michaux (large-tooth aspen) is infrequent; occurs in small patches.

*Fraxinus americana* Linnaeus (white ash) is very infrequent and of small size.

*Ostrya virginiana* (Miller) K. Koch (hornbeam), infrequent.

*Pinus resinosa* Aiton (red pine), infrequent and in patches mixed with white pine.

The poplars and paper birch are usually prominent in the younger stands that have developed as a result of fire. Conifers occur in the older stands that have escaped recent fires and that have not been severely cut over. The tolerant hardwoods generally occur also in the older stands, and being more resistant to fire and less frequently cut by the logger are usually more abundant than are the conifers. Coniferous growth is, therefore, not prominent, being largely hidden from view by the hardwoods and generally reduced to very young growth.

In the older stands where white spruce, either of the pines, hard maple, balsam fir, or yellow birch may dominate there is as a rule always an admixture of paper birch and poplar and an undergrowth of sapling size of scattered white spruce, balsam fir, sugar maple, and occasional yellow birch. Saplings of pine, paper birch, poplars, red maple, or white cedar are unusual, and when occurring seem to be present only in the rather open places, generally following the removal of certain trees by man or by windfall. It is to be expected that there will always be such openings occurring throughout this forested region. The strong winds from the east shores of lake Superior are very effective in creating openings in almost any of the stands, even sugar maple and yellow birch, two sturdy and usually securely rooted trees, are not totally resistant to windthrow in some parts of the area. Added to this is the factor of human interference, which in itself is effective enough to assure the maintenance of this mixed forest.

From the economic viewpoint the removal of the merchantable softwoods from this forest would seem to be dependent on there being an advanced growth of young conifers. No such requirement is necessary in the case of the removal of the deciduous trees, there being in most places always

a plentiful supply of young hardwood growth. If such precautions were taken and the forest protected from fire, it would be reasonable to expect a continuation of the merchantable crop. Unfortunately, the leaving of an abundance of slash in the thinly populated stand that is usually left after logging, creates such a favourable fire condition that protection from burning is very difficult if not impossible. In the region studied the forests are somewhat protected from fire in their proximity to lake Superior; devastating fires have not been as frequent as is the case in many parts of Ontario, nevertheless, it is evident that fire is one of the leading factors in maintaining many of the stands in a somewhat unprofitable condition, and in adding to the area that is already occupied by this forest as a whole.

Beneath the variable canopy formed by the forest there is a great diversity in the composition of the shrub and herbaceous vegetation. The following list is composed only of the species prominent throughout, after which representative forest associations are described.

#### *Shrubs and Smaller Trees*

<i>Taxus canadensis</i>	<i>R. parviflorus</i> var. <i>bifarius</i>
<i>Salix longifolia</i>	<i>Prunus pennsylvanica</i>
<i>Corylus rostrata</i>	<i>Nemopanthus mucronata</i>
<i>Alnus incana</i>	<i>Acer pennsylvanicum</i>
<i>Ribes lacustre</i>	<i>A. spicatum</i>
<i>R. glandulosum</i>	<i>Cornus alternifolia</i>
<i>Aronia floribunda</i>	<i>Vaccinium pennsylvanicum</i>
<i>Amelanchier laevis</i> (also other species)	<i>V. canadense</i>
<i>Rubus Idaeus</i> var. <i>strigosus</i>	<i>Viburnum cassinoides</i>
	<i>Diervilla Lonicera</i>

#### *Herbaceous and Low Woody Plants*

<i>Thelypteris spinulosa</i> var. <i>intermedia</i>	<i>G. pubescens</i>
<i>Lycopodium clavatum</i>	<i>Corallorrhiza maculata</i>
<i>L. obscurum</i>	<i>Actaea rubra</i>
<i>L. complanatum</i>	<i>Polygala paucifolia</i>
<i>Oryzopsis asperifolia</i>	<i>Viola cucullata</i>
<i>Carex arctata</i>	<i>Circaea alpina</i>
<i>C. intumescens</i>	<i>Aralia nudicaulis</i>
<i>C. projecta</i>	<i>Sanicula marilandica</i>
<i>C. tenella</i>	<i>Osmorhiza Claytonii</i>
<i>Arisaema triphyllum</i>	<i>Cornus canadensis</i>
<i>Clintonia borealis</i>	<i>Monotropa uniflora</i>
<i>Maianthemum canadense</i>	<i>Trientalis borealis</i>
<i>Streptopus amplexifolius</i>	<i>Solidago rugosa</i>
<i>S. roseus</i>	<i>Aster macrophyllus</i>
<i>Trillium cernuum</i> var. <i>macranthum</i>	<i>A. Tradescanti</i>
<i>Cypripedium acaule</i>	<i>Hieracium scabrum</i>
<i>Goodyera repens</i> var. <i>ophioides</i>	<i>Lactuca canadensis</i>
<i>G. tessellata</i>	<i>L. spicata</i>

#### *Hemlock-White Pine Forest*

##### *Trees*

<i>Tsuga canadensis</i>	<i>Thuja occidentalis</i>
<i>Pinus Strobus</i>	<i>Acer saccharum</i>
<i>Picea glauca</i>	

## Hemlock-White Pine Forest—Concluded

## Shrubs

1·1 *Sambucus pubens*  
1·3 *Ribes lacustre*

2·3 *Taxus canadensis*

## Herbs

2·1 *Aralia nudicaulis*  
1·3 *Trientalis borealis*  
2·1 *Maianthemum canadense*  
+·1 *Cornus canadensis*  
2·3 *Linnaea borealis* var. *americana*

+·3 *Lycopodium lucidulum*  
1·1 *Oxalis montana*  
+·1 *Trillium cernuum* var. *macranthum*  
+·1 *Polygonatum pubescens*  
1·1 *Gaultheria procumbens*

## Mosses

*Polytrichum commune* L.  
*Calliergon Schreberi* Willd.

*Dicranum undulatum* Ehrh.  
*Bazzania trilobata* (L.) S. F. Gray

Areas examined: (1) Batchawana island; (2) main highway west of Harmony river.

The dominant species being mostly conifers it might be expected that less light reaches the forest floor than is the case in the stands of the deciduous forest formation, but in the places where this association was encountered the topography is very rugged, causing an irregularity of ground surface that results in a correspondingly irregular level of the canopy overhead, thus permitting many well-lighted patches within what would otherwise be a fairly sombre shade. Due to the differences in habitat that result there is a very varied vegetation, the list above including species that are characteristic in the deciduous forest, others that one normally associates with the coniferous forest, a few that usually frequent cool, moist woods, and some that are invariably present on the light, sandy soils of open woods. Judging from the vegetation it is evident that conditions are not very stable, that changes are taking place that create habitats suitable to a great many different plants. The thin soil on the rocky surfaces prevents the trees from becoming securely rooted, and openings result from windfall at frequent intervals. The slipping down of rock exposes new soil and covers older soil. There are, therefore, within the stand many examples of plant succession taking place, not only as a result of biotic change, but frequently largely because of alterations in the topography.

Throughout there is a good proportion of deciduous species, although the sugar maple seems to be the only one capable of maintaining a place amongst the dominants. The secondary deciduous species include *Acer rubrum*, *Betula papyrifera*, *Betula lutea*, and *Populus grandidentata*, and they are generally to be considered as forming part of the undergrowth. Of the conifers, in addition to those already listed, will be found *Abies balsamea* and *Picea mariana*, both being prominent members of the secondary tree species.

The undergrowth is not at all uniform, being so irregular that frequent areas are occupied only by ground vegetation of approximately a foot or less in height. The principal secondary shrubs are, *Sorbus americana*, *Acer pennsylvanicum*, *A. spicatum*, and *Amelanchier laevis*.

Due to the irregular canopy and the sparsity of a distinct undergrowth the ground vegetation is in many places a very conspicuous feature, and a great many species in addition to those listed occur. Of these the following are rather commonly found:

*Thelypteris spinulosa* var. *intermedia*  
*Polypodium virginianum*  
*Bromus ciliatus* var. *intonsus*  
*Deschampsia flexuosa*  
*Agrostis stolonifera*  
*Carex arctata*  
*Clintonia borealis*

*Streptopus roseus*  
*Corallorrhiza maculata*  
*Coptis groenlandica*  
*Corydalis sempervirens*  
*Pyrola secunda*  
*Vaccinium pennsylvanicum*  
*Melampyrum lineare*  
*Solidago rugosa*

Stands of this character, although usually occupying small areas, occur more or less commonly throughout the area largely covered by the deciduous forest formation. They represent a much more mature type of forest than is the case in the remaining stands to be described, and because of their high coniferous composition they add much to the summer and autumn beauty of the country.

### White Pine-Poplar Forest

#### Trees

*Pinus Strobus*  
*Abies balsamea*

*Populus tremuloides*  
*Betula papyrifera*

#### Shrubs

3·2 *Corylus rostrata*  
 1·1 *Vaccinium canadense*  
 1·1 *V. pennsylvanicum*

3·2 *Acer spicatum*  
 1·3 *Diervilla Lonicera*

#### Herbs

3·1 *Aster macrophyllus*  
 2·1 *Aralia nudicaulis*  
 1·2 *Coptis groenlandica*  
 +·1 *Clintonia borealis*

+·3 *Mitella nuda*  
 +·1 *Streptopus roseus*  
 +·2 *Trientalis borealis*  
 1·2 *Viola renifolia*

Areas examined: (1) Mamainse harbour; (2) main highway east of Batchawana river.

The dominant tree is white pine with an admixture of trembling aspen and an occasional paper birch. Infrequently red pine (Figure 9) mingles with the white pine, but in most places the white pine and poplar are the two main trees. Balsam fir is present in the undergrowth and also, occasionally, white spruce. Associated with them and usually dominating the undergrowth are two shrubs, mountain maple and hazelnut, in many places forming a dense growth that obstructs one's view through the forest. Of the lower plants, dwarf shrubs are infrequent, the two blueberries being the principal ones. Herbaceous plants are, however, plentiful, especially wherever openings in the undergrowth occur. The more important of these, in addition to those listed above, are:

*Thelypteris spinulosa* var. *intermedia*  
*Oryzopsis asperifolia*

*Maianthemum canadense*  
*Cornus canadensis*



In the younger stands and in very open parts of the older stands large patches of *Aster macrophyllus* may occupy the ground almost completely (Figure 7). On the other hand, wherever the pine is dense there is a noticeable absence of under vegetation, the ground being covered with a carpet of pine leaves.



79878

Figure 7. *Aster macrophyllus* growing abundantly under twenty-year old paper birch, Coppermine point.

There are few stands of this type of forest left in the region examined, logging operations having removed most of the pine. Mature white pine trees that do occur are more or less scattered, or form small stands occupying the less accessible areas such as steep slopes and small areas isolated from streams (Figure 8). A few stands of young growth occur, particularly in the vicinity of Mamainse harbour, but generally the young pine is scattered or patchy on the well-drained, sandy soils where paper birch and poplar dominate (Figure 7). These intolerant hardwoods will probably be succeeded by the pines, balsam, and some spruce, with perhaps an occasional tolerant hardwood. That they will eventually become purely coniferous is problematical, and dependent largely on whether there is a recurrence of fire. The ground vegetation in these young stands is not unlike that occurring in mature white pine stands examined some years ago in Algonquin park, and if such is a reliable index it would be reasonable to expect that certain areas within Algoma will again be populated with stands of white pine. In suggesting this, one is naturally overlooking the probable spread of the





79815

Figure 8. White and red pine stand near Havilland bay.



79818

Figure 9. Principally red pine, near Havilland bay.

white pine blister rust, which was found at three places, Mamainse harbour, at the mouth of Sable river, and near the mouth of Pancake river. In the first two places the rust was found on *Ribes nigrum* L., the common garden black currant, which has been introduced into the region by settlers. At Pancake river it was found infecting the common skunk currant *R. glandulosum* Grauer. No infected pines were observed, although it is not to be expected that they have all escaped.

### Open-Grown Poplar-Birch Forest

#### Trees

*Populus tremuloides*  
*P. grandidentata*

*Betula papyrifera*

#### Shrubs

3.2 *Acer spicatum*  
+ .1 *Nemopanthus mucronata*

+ .1 *Lonicera canadensis*  
3.2 *Corylus rostrata*

#### Herbs

3.3 *Aster macrophyllus*  
+ .1 *A. Tradescanti*  
+ .2 *Carex Deweyana*  
3.5 *Cornus canadensis*  
+ .1 *Hieracium scabrum*

+ .1 *Lactuca canadensis*  
2.1 *Pteridium latiusculum*  
+ .1 *Solidago rugosa*  
+ .2 *Viola cucullata*

Areas examined: (1) opposite Chapman's farm on the main highway; (2) Mamainse harbour.

This is a common type of stand that now occupies severely burned over areas. It is definitely a temporary type and would if protected from fire eventually be supplanted by more tolerant hardwoods or conifers, or mixtures of the two.

The majority of the birches appear in small clumps (Figure 7), evidence that they have originated from previous birch trees rather than from seed. The poplars are grouped into rather large patches, covering several square yards, many of them doubtless from root suckers of a previous poplar tree. The resulting forest is thus rather regular, being mainly trembling aspen, interrupted by openings or by clumps of birch (Figure 10).

In the openings, some of which are quite large in area, there is a shrubby vegetation of:

*Rubus Idaeus* var. *strigosus*  
*R. parviflorus*  
*Corylus rostrata*  
*Amelanchier* (various species)  
*Symphoricarpos albus*

*Cornus stolonifera*  
*Prunus pennsylvanica*  
*P. virginiana*  
*Alnus incana*  
*Salix discolor*

Occasionally some of these shrubs occur throughout the stand, and in addition there is a rather variable ground vegetation, the character of which depends on many factors, but of great importance so far as the future composition is concerned is the character of the previous stand and the severity of the fire that destroyed it. At the present time a great mixture of species occupies the area; many of them will gradually disappear, such for example as those that are common on roadways, in open fields, and on

abandoned farm land, but there are in addition to them practically all of the plants that are also characteristic of mature woodlands and many of these will remain. The following list is compiled from collections made on two widely separated areas, and includes the species that are prominent but not mentioned in the stand list:

*Pteridium latiusculum*  
*Lycopodium clavatum*  
*L. complanatum*  
*Poa compressa*  
*Danthonia spicata*  
*Agrostis scabra*  
*Oryzopsis asperifolia*  
*Luzula saltuensis*  
*Maianthemum canadense*

*Rubus pubescens*  
*Fragaria virginiana*  
*Trifolium hybridum*  
*Polygala paucifolia*  
*Epilobium angustifolium*  
*Apocynum androsaemifolium*  
*Melampyrum lineare*  
*Linnaea borealis* var. *americana*  
*Aster lateriflorus*



79889

Figure 10. Trembling aspen twenty-two years old with occasional clumps of birch throughout and many open areas.

This rich vegetation of tall herbs and the various clumps of shrubs creates an unfavourable seed bed for any conifer seed that migrates into the area. At the present time there are to be found, at widely spaced intervals, very small black spruce, white spruce, tamarack, or cedar trees, but the last fire removed practically completely the conifer element and for some time to come deciduous species will maintain themselves. Until the few small conifers present on the area attain seed-bearing size there is small hope of conifers becoming important members of the stand. It will, therefore, be many years before they are again conspicuous. Using the

vegetation as an index there is little doubt but that this stand represents a stage in the development towards a coniferous forest. Few of the herbaceous species characteristic of the deciduous forest formation are to be found, whereas on the other hand the lists contain many species that characterize coniferous forests.

### Alder Thickets

#### Trees or High Shrubs

5.5 <i>Alnus incana</i>	+ .1 <i>Picea mariana</i>
+ .2 <i>Salix discolor</i>	+ .1 <i>Larix laricina</i>
+ .2 <i>S. Bebbiana</i>	+ .1 <i>Nemopanthus mucronata</i>
+ .1 <i>Prunus pennsylvanica</i>	+ .1 <i>Picea glauca</i>
+ .1 <i>Amelanchier laevis</i>	+ .1 <i>Betula papyrifera</i>
+ .1 <i>Sorbus americana</i>	+ .1 <i>Aronia floribunda</i>
+ .2 <i>Viburnum cassinoides</i>	+ .1 <i>Populus tremuloides</i>

#### Herbs and Low Shrubs

1.8 <i>Calamagrostis canadensis</i>	+ .1 <i>E. sylvaticum</i>
+ .3 <i>Carex oligosperma</i>	+ .1 <i>Geocaulon lividum</i>
+ .2 <i>C. paupercula</i> var. <i>pallens</i>	+ .1 <i>Habenaria clavellata</i>
+ .2 <i>C. projecta</i>	+ .1 <i>H. dilatata</i>
+ .2 <i>C. sterilis</i>	+ .3 <i>Ledum groenlandicum</i>
+ .2 <i>C. stricta</i> var. <i>angustata</i>	+ .1 <i>Maianthemum canadense</i>
+ .2 <i>C. tenella</i>	+ .2 <i>Osmunda Claytoniana</i>
+ .2 <i>C. trisperma</i>	2.3 <i>Ribes glandulosum</i>
+ .1 <i>Circaea alpina</i>	+ .1 <i>Rubus Idaeus</i> var. <i>strigosus</i>
+ .3 <i>Chamaedaphne calyculata</i>	1.1 <i>R. pubescens</i>
+ .3 <i>Chiogenes hispidula</i>	+ .1 <i>Smilacina trifolia</i>
+ .1 <i>Coptis groenlandica</i>	+ .1 <i>Trientalis borealis</i>
+ .1 <i>Equisetum arvense</i>	1.1 <i>Thelypteris spinulosa</i>
+ .3 <i>E. limosum</i>	+ .1 <i>Vaccinium canadense</i>
+ .1 <i>E. palustre</i>	1.3 <i>Viola cucullata</i>

#### Mosses

<i>Sphagnum acutifolium</i> Ehrh.	<i>Hypnum</i> L. (sp.)
<i>S. squarrosum</i> Pers.	<i>Dicranum</i> Timm. (sp.)
<i>S. cymbifolium</i> (Ehrh.) Hedw.	<i>Polytrichum commune</i> L.

Area examined: on the main highway between Pancake river and Chapman's farm.

The only alder thickets examined occur on what was previously a black spruce-sphagnum bog forest. Fire swept through the black spruce in 1909 and since that time the burned area has become occupied by practically a pure stand of *Alnus incana*, now approximately 15 feet high and very dense. A mixture of other species mingles throughout, but the individuals occur very infrequently and the alders, having approximately ten thousand stems to the acre, prevent them from being noticeable. This facies of the black spruce forest extends for nearly 2 miles, bordering both sides of the highway and covering many acres of low-lying flat country (Figure 11).

The soil conditions have been considerably altered from what they were when the black spruce dominated the area. The light condition is now very unfavourable for a luxuriant ground vegetation, but it is very

uniform throughout, probably much more so than is the condition of the soil. In spite of these very evident changes the composition of the ground vegetation that has succeeded in populating the area since the fire occurred is remarkably similar to that of the previous stand (page 26). There is, however, a great difference in the abundance and frequency of the different species and also in their relative ecological importance within the stand. It is nevertheless not difficult to visualize the eventual return to this area of the black spruce forest. It will, however, be many years before the small spruce trees that occasionally occur are large enough to reseed the area; thus the development towards a conifer forest will be exceedingly slow. At the present time, after sixteen years, the very few small black spruce trees that occur are approximately 5 feet high; they represent the



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Figure 11. Alder thicket occupying an area that supported a black spruce-tamarack stand approximately sixteen years ago.

few survivals of the fire, then as little trees or as viable seeds. Even if they should produce seed within twenty years, from which a few more trees developed, it would be fifty years from now before a moderate sprinkling of spruce covered the area, and probably more than a hundred years before a spruce stand developed. During that time fire may again sweep the area and set farther away the time when a forest crop may be expected. The loss of the timber on an area that is burned over is, therefore, not the only fire loss; perhaps a greater disaster is the loss of time, the fact that many years, sometimes a hundred or more, must elapse before that area returns to what it was fifty or a hundred years previous to the fire.

*Woodland Meadows*

Bordering the main roads and less commonly within the forested areas there are meadow-like fields and partial clearings; small areas that were made by man, for agricultural purposes, settlement, or during logging operations (Figure 12).

The composition and character of the vegetation varies considerably from place to place, even within one meadow. Due to differences in humidity determined by the uneven ground surface there are plants of wet situations and of dry situations occurring within a few feet of each other. In the open meadow parts forest plants are rarely found, but in and around the clumps of shrubbery there are few meadow plants; generally instead there are species that normally belong to a forest association. The influence of difference in humidity and changes in light conditions is, therefore, very apparent.



79814

Figure 12. Open clearing at Batchawana village.

There is also a difference in the aspect of the vegetation at different seasons. Towards the end of July, when the meadows were being examined, the alsike clover, pearly everlasting, and yarrow gave to the whole a distinct whitish colour-blend which later in August was very completely changed by the coming into bloom of the golden rods and asters which were everywhere plentiful.



Since these areas were evidently once completely cleared, some of them even cultivated for a time, and are now more or less dotted with clumps of shrubs and trees, it is evident that the meadow plants will eventually disappear. Two lists of herbaceous plants are, therefore, given. In the first list plants of the open meadows only are listed; the trees and shrubs and species occurring with them are then given. The lists are from studies made at Batchawana village, the mouth of Carp river, and on the highway opposite the north side of Chapman's farm.

#### Meadow Plants

<i>Pteridium latiusculum</i>	<i>Scrophularia lanceolata</i>
<i>Poa compressa</i>	<i>Veronica arvensis</i>
<i>P. pratensis</i>	<i>Plantago major</i>
<i>Agropyron repens</i>	<i>Solidago canadensis</i>
<i>Danthonia spicata</i>	<i>S. rugosa</i> var. <i>villosa</i>
<i>Calamagrostis canadensis</i>	<i>Aster lateriflorus</i>
<i>Agrostis scabra</i>	<i>A. macrophyllus</i>
<i>Carex foenea</i>	<i>A. Tradescanti</i>
<i>Luzula saltuensis</i>	<i>Anaphalis margaritacea</i>
<i>Rumex acetosella</i>	<i>Ambrosia trifida</i>
<i>Cerastium vulgatum</i>	<i>Rudbeckia hirta</i>
<i>Ranunculus acris</i>	<i>Archillea Millefolium</i>
<i>Fragaria virginiana</i>	<i>Matricaria suaveolens</i>
<i>Potentilla tridentata</i>	<i>Chrysanthemum Leucanthemum</i>
<i>Geum aleppicum</i> var. <i>strictum</i>	var. <i>pinnatifidum</i>
<i>Trifolium hybridum</i>	<i>Hieracium canadense</i>
<i>Viola cucullata</i>	<i>H. scabrum</i>
<i>Epilobium angustifolium</i>	<i>H. scabriusculum</i>
<i>Apocynum androsaemifolium</i>	<i>Taraxacum officinale</i>
<i>Agastache Foeniculum</i>	<i>Lactuca canadensis</i>
<i>Dracocephalum parviflorum</i>	<i>L. spicata</i>
<i>Nepeta Cataria</i>	

#### Shrubbery

<i>Picea glauca</i>	<i>Aronia floribunda</i>
<i>Abies balsamea</i>	<i>Amelanchier sanguinea</i>
<i>Pinus Strobus</i>	<i>A. huronensis</i>
<i>Thuja occidentalis</i>	<i>A. Bartramiana</i>
<i>Juniperus communis</i> var. <i>depressa</i>	<i>Rubus Idaeus</i> var. <i>strigosus</i>
<i>Populus tremuloides</i>	<i>R. parviflorus</i> var. <i>bifarius</i>
<i>P. grandidentata</i>	<i>Prunus pennsylvanica</i>
<i>Salix discolor</i>	<i>P. virginiana</i>
<i>S. Bebbiana</i>	<i>Acer rubrum</i>
<i>Corylus rostrata</i>	<i>Cornus stolonifera</i>
<i>Betula papyrifera</i>	<i>Vaccinium canadense</i>
<i>Alnus incana</i>	<i>V. corymbosum</i>
<i>Ulmus americana</i>	<i>V. pennsylvanicum</i>
<i>Ribes oxycanthoides</i>	<i>Sambucus pubens</i>
<i>R. lacustre</i>	<i>Viburnum cassinoides</i>
<i>R. triste</i>	<i>Diervilla Lonicera</i>
<i>Physocarpus opulifolius</i>	

#### Herbaceous Species Associating with the Shrubbery

<i>Pteridium latiusculum</i>	<i>Cypripedium acaule</i>
<i>Lycopodium complanatum</i>	<i>Spiranthes Romanzoffiana</i>
<i>Oryzopsis asperifolia</i>	<i>Rubus pubescens</i>
<i>Maianthemum canadense</i>	<i>Polygala paucifolia</i>

*Herbaceous Species Associating with the Shrubbery—Concluded*

*Viola cucullata*  
*Cornus canadensis*  
*Pyrola elliptica*  
*Melampyrum lineare*

*Linnaea borealis* var. *americana*  
*Solidago rugosa* var. *villosa*  
*Aster macrophyllus*

## THE NORTHERN CONIFEROUS FOREST FORMATION

It is not until one reaches Coppermine point, while travelling along the highway, that a noticeable change in the general hardwood type of forest is realized; from this point northward conifer stands begin to occur. A few scattered examples may be seen occupying the more exposed lower slopes south of Coppermine and farther inland, covering some of the lower swampy areas, but they are of small extent and many of them are more of the nature of muskegs than typifying the formation. The typical spruce-balsam-paper birch forest is, therefore, not characteristic of the area examined, logging operations and forest fires having transformed much of it into stands that are now largely composed of temporary species. There is little doubt, however, that a great many of these temporary stands would under natural conditions eventually become coniferous.

At the present time balsam fir is the most commonly occurring tree and except in the lowlands where black spruce and white cedar predominate it outnumbers all others. White spruce has been largely cut out, but when found it reaches much larger sizes than the balsam; trees one hundred and fifty years of age, 80 feet in height and 18 inches in diameter, left by the loggers, indicate that under natural conditions it would be an important tree. The third important tree is paper birch, which at present is the most conspicuous member of the forest and in places, usually following a fire, it forms practically pure stands. These three species form the important tree element of the forest, but with them are associated others that may under certain conditions dominate small areas. On the lowlands, especially on poorly drained areas, black spruce frequently occurs in pure stands, or mixed with white cedar and tamarack. On the drier sites trembling aspen may form almost pure stands, but was not found as a permanent member of the formation. A conspicuous element, particularly at the seasons of flowering and fruiting, although usually a small tree, is the mountain ash which is well scattered throughout.

In general the soils are thin, of a sandy or gravelly, and frequently rocky, nature, and trees have difficulty in becoming securely anchored in the soil. Undoubtedly this has much to do with the common occurrence of windfalls and the resultant ragged and untidy, and often irregular, appearance of the forest. The windfall areas receive more light, and the sun reaching the forest floor is assisted by other newly created influences in the development of a luxuriant growth of vegetation, amongst which conifer reproduction will usually be found. Careful observation throughout several stands suggests that were it not for these open areas, whether resulting from windfall or other causes, few of the conifer seedlings that occur would ever succeed in developing into merchantable trees. Such openings seem also to be the salvation of the paper birch in the forest; seedlings of this tree were found only in such locations and young birch trees were not

found elsewhere. Balsam fir on the other hand was found in all sizes throughout the stands and although suffering in the shade of higher trees seems able to persist better than either spruce or paper birch.

The following is a list of the trees of this forest arranged in order of their probable importance so far as tree composition is concerned:

*Abies balsamea* (L.) Miller—balsam fir  
*Betula papyrifera* Marshall—paper birch  
*Picea glauca* (Moench) Voss—white spruce  
*P. mariana* (Miller) B. S. P.—black spruce  
*Larix laricina* (Du Roi) Koch—tamarack  
*Thuja occidentalis* Linnaeus—white cedar  
*Sorbus americana* Marshall—mountain ash  
*Populus tremuloides* Michaux—trembling aspen  
*Acer rubrum* Linnaeus—red maple

The conspicuous undergrowth so characteristic of the deciduous forests is not a feature in the conifer stands. Shrubs and smaller trees do not occur abundantly enough to form a very distinct under stratum, and as a result the interior of the forest appears to be very open. Of the higher shrubs or shrub-like trees that occur the following are commonly found:

<i>Corylus rostrata</i>	<i>Nemopanthus mucronata</i>
<i>Alnus incana</i>	<i>Acer pennsylvanicum</i>
<i>Aronia floribunda</i>	<i>A. spicatum</i>
<i>Amelanchier</i> (various species)	<i>Viburnum cassinoides</i>

The low shrubs, which are usually approximately 2 feet high, are in many places a very prominent feature, and assisted by many high, herbaceous plants give the impression of a knee-high carpet of vegetation through which one could travel readily were it not for the common occurrence of fallen tree material. The important low shrubs are:

<i>Taxus canadensis</i>	<i>Vaccinium canadense</i>
<i>Ribes glandulosum</i>	<i>V. pennsylvanicum</i>

Herbaceous plants may be frequently overlooked, being rather hidden from view amongst the dwarf shrubs; they are, however, usually fairly abundant. The most important are:

<i>Thelypteris</i> (various species)	<i>Pyrola</i> (various species)
<i>Osmunda Claytoniana</i>	<i>Moneses uniflora</i>
<i>Clintonia borealis</i>	<i>Monotropa uniflora</i>
<i>Maianthemum canadense</i>	<i>M. Hypopitys</i>
<i>Habenaria</i> (various species)	<i>Gaultheria procumbens</i>
<i>Goodyera</i> (various species)	<i>Epigaea repens</i>
<i>Listera cordata</i>	<i>Chiogenes hispidula</i>
<i>Coptis groenlandica</i>	<i>Linnaea borealis</i> var. <i>americana</i>
<i>Cornus canadensis</i>	

A very conspicuous and ecologically important character of the ground cover is the abundance of mosses and lichens, practically every stand being carpeted with this type of vegetation. This feature alone serves as a ready means of recognizing the formation, and is in striking contrast with the scarcity of such plants in the deciduous forest. Although the Bryophyte

vegetation was not collected and an examination of it did not form part of this study many readily recognized species were noted, and the following is a fairly typical list of some of the most prominent ones:

<i>Bazzania trilobata</i> (L.) S. F. Gray	<i>Hylocomium triquetrum</i> (L.) B. and S.
<i>Calliergon Schreberi</i> (Willd.)	<i>Hypnum Crista-castrensis</i> L.
<i>Dicranum undulatum</i> Ehrh.	

In the wet situations species of *Sphagnum* usually predominate.

This moss vegetation is not hidden from view; the herbaceous plants and shrubs being somewhat separated from one another produce only a partial screen, whereas in some stands the shade cast by the tree growth prevents herbaceous vegetation altogether and the mosses are then practically the only ground cover.

The following are the forest associations that were examined:

#### *White Spruce-Paper Birch Forest*

##### *Trees*

<i>Picea glauca</i>	<i>Populus tremuloides</i>
<i>Abies balsamea</i>	<i>P. grandidentata</i>
<i>Betula papyrifera</i>	

##### *Shrubs and Shrub-like Trees*

1·2 <i>Acer spicatum</i>	2·2 <i>Corylus rostrata</i>
2·2 <i>Alnus incana</i>	2·2 <i>Sambucus pubens</i>
1·1 <i>Amelanchier laevis</i>	2·4 <i>Taxus canadensis</i>

##### *Herbs and Dwarf Shrubs*

1·3 <i>Chiogenes hispidula</i>	1·3 <i>Linnaea borealis</i> var. <i>americana</i>
1·1 <i>Clintonia borealis</i>	2·1 <i>Maianthemum canadense</i>
+·3 <i>Coptis groenlandica</i>	1·1 <i>Pyrola secunda</i>
2·1 <i>Cornus canadensis</i>	2·4 <i>Vaccinium canadense</i>
1·3 <i>Gaultheria procumbens</i>	2·4 <i>V. pennsylvanicum</i>
+·1 <i>Goodyera</i> (various species)	1·3 <i>Viola pallens</i>

##### *Mosses*

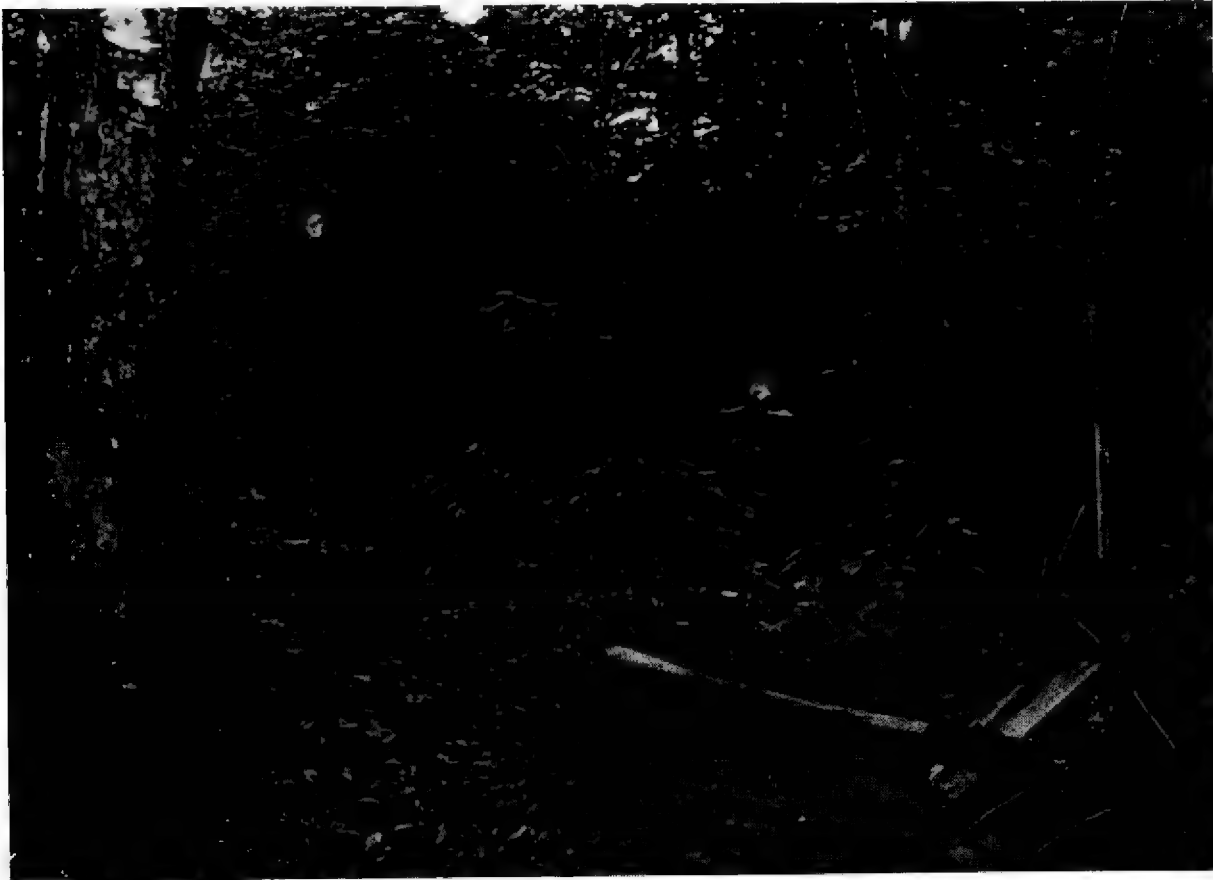
<i>Calliergon Schreberi</i> Willd.	<i>Hylocomium triquetrum</i> (L.) B. and S.
<i>Dicranum undulatum</i> Ehrh.	<i>Hypnum Crista-castrensis</i> L.
<i>Hylocomium proliferum</i> (L.) Lindb.	<i>Polytrichum commune</i> L.

Areas examined: (1) on the highway near Pancake river; (2) on the highway west of Batchawana river; (3) Batchawana island; (4) on the highway near Mamainse harbour.

Paper birch is usually the dominant species, and in some cases may aggregate to form almost pure stands. This is particularly noticeable in the younger stands before the spruce and balsam have become large enough to be conspicuous. Pure stands of spruce were not found, although occasionally a few spruce trees dominate small areas. In general there is a sprinkling of spruce and balsam occurring throughout a somewhat open stand of mainly birch with occasionally patches of trembling aspen or large-toothed aspen taking the place of the birch. As the stand is rather

open there is usually a good proportion of light penetrating the interior which permits a fairly conspicuous undergrowth of shrubs and herbaceous plants (Figure 13).

In addition to the primary trees, less common species occur, such as red maple, mountain ash, balsam poplar, white pine, white cedar, and black spruce, but these trees are rarely plentiful and over large areas may be absent altogether.



79811

Figure 13. Interior view of white spruce-paper birch stand showing derelict balsam fir.

The undergrowth blends in with the ground vegetation and is, therefore, rather inconspicuous. It is only at irregular intervals, in the very open parts of the stand, that high shrubs or small trees are sufficiently abundant to suggest an undergrowth. Shrubby vegetation, however, when included with the herbaceous plants, usually creates a fairly profuse ground cover, principally in the less dense parts of the stand. In many places, particularly where the conifers are more prominent, there is very little ground cover other than the thickness of mosses, which occur more or less continuously throughout, but reach their best development in the well-shaded places.

Stands of this nature are not prominent in the region, but they represent a forest that agrees quite well with Cooper's (10) "climatic" forest of Isle Royale. The fact that white spruce is not very prominent at present is no doubt a direct result of the logging operations of the recent past.

*Black Spruce Forest**Trees**Picea mariana**Shrubs*

- |                                    |                                  |
|------------------------------------|----------------------------------|
| +·1 <i>Aronia floribunda</i>       | +·1 <i>Nemapanthus mucronata</i> |
| 1·3 <i>Chamaedaphne calyculata</i> | +·1 <i>Vaccinium canadense</i>   |
| +·1 <i>Ilex verticillata</i>       | +·2 <i>Viburnum cassinoides</i>  |
| 1·3 <i>Ledum groenlandicum</i>     |                                  |

*Herbs*

- |  |                                  |
|--|----------------------------------|
| +·2 <i>Carex oligosperma</i>                 | +·1 <i>E. palustre</i>           |
| +·2 <i>C. paupercula</i> var. <i>pallens</i> | +·1 <i>Geocaulon lividum</i>     |
| +·2 <i>C. sterilis</i>                       | +·1 <i>Habenaria clavellata</i>  |
| +·2 <i>C. stricta</i> var. <i>angustata</i>  | +·1 <i>H. dilatata</i>           |
| 2·2 <i>C. trisperma</i>                      | +·1 <i>H. obtusata</i>           |
| 2·3 <i>Chiogenes hispidula</i>               | 2·1 <i>Smilacina trifolia</i>    |
| 1·3 <i>Coptis groenlandica</i>               | +·1 <i>Thelypteris spinulosa</i> |
| +·3 <i>Equisetum limosum</i>                 | +·2 <i>Vaccinium Oxycoccus</i>   |

*Mosses*

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| <i>Polytrichum commune</i> L.     | <i>S. squarrosus</i> Pers.          |
| <i>P. juniperinum</i> Willd.      | <i>S. cymbifolium</i> (Ehrh.) Hedw. |
| <i>Sphagnum acutifolium</i> Ehrh. |                                     |

Area examined: on the highway west of the north boundary of the Chapman farm.

Forest fires have transformed several black spruce stands into what are now practically pure alder thickets (See page 28), so that only a few, small, patchy stands of this forest association persist within Batchawana area. The association is an edaphic climax, and the changes in the soil that result from severe burning and through the populations of plants that follow after fire will, it is believed, prevent this association from regaining its previous prominence in the region, at least for a great number of years.

The forest is fairly dense (Figure 14), composed of black spruce in pure stands. The trees are generally of very uniform height and of approximately the same diameters breast high. In the stand examined, two age classes are represented, one hundred and ninety-two years and eighty years. The maximum height of the trees was 55 feet and the average diameter 5·0 inches. The density ranges from 150 trees on an acre to 700 in the densest parts.

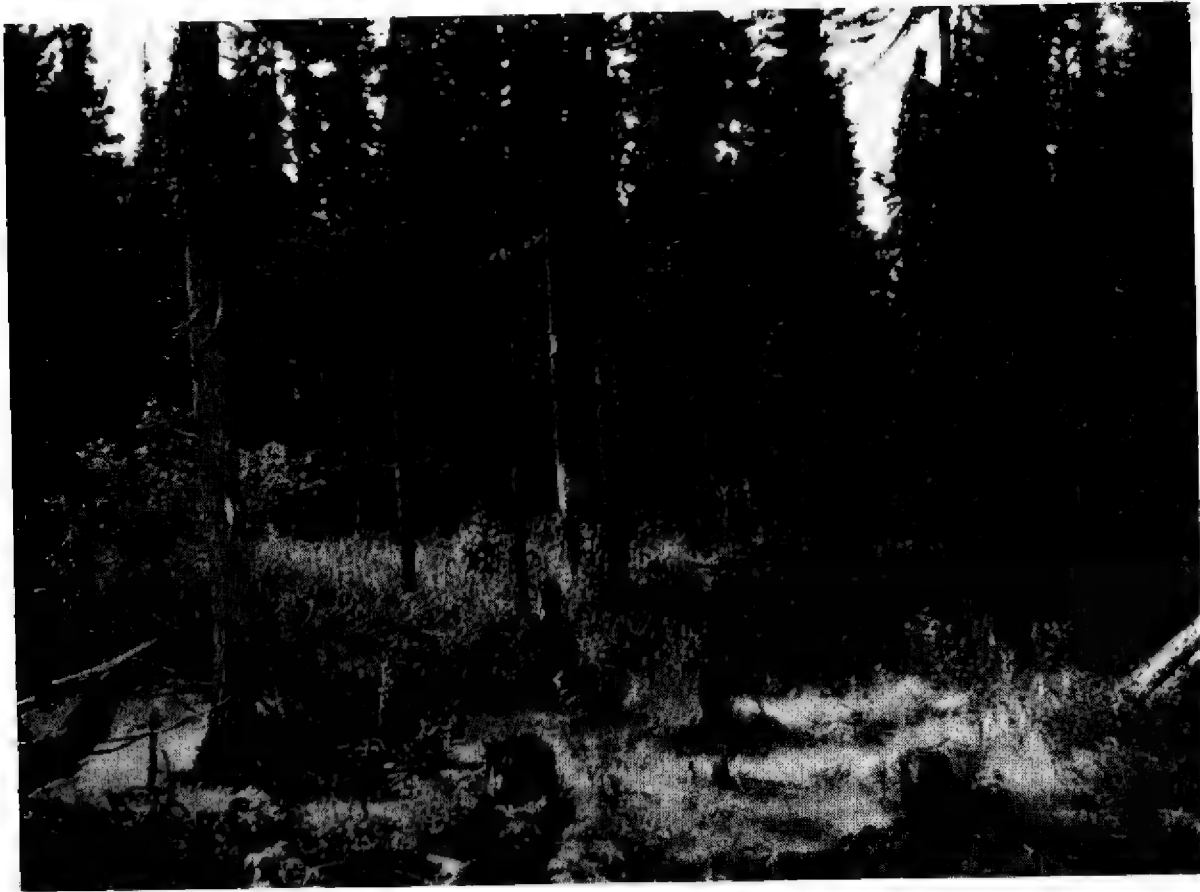
Throughout, there are areas where windfalls have occurred, with the result that there are two facies of undergrowth. The openings provide conditions that permit certain shrubs such as alder, leather leaf, and labrador tea to dominate. These species are scarcely present in the main stand, where sphagnum moss and the Carices are the main species of undergrowth.

In general the stand is without an undergrowth of trees or shrubs and void of tree reproduction. The thick carpet of sphagnum, into which one sinks to a depth of approximately 6 inches, and the low light value



throughout most of the stand, apparently prevent tree seedlings and shrubs from developing. There is, however, at fairly frequent intervals an appearance of abundant young growth, due to the layering of the lower branches of some trees.

Although a number of herbaceous plants are listed as entering into the composition of this stand, the majority of them occur very infrequently and the general appearance is that of a sparsity of vegetation, in this respect differing markedly from the principal stands of the coniferous formation.



79890 Figure 14. View of black spruce stand from the highway near Chapman's farm.

### *Spruce-Cedar Bog Forest*

#### *Trees*

*Picea mariana*

*Thuja occidentalis*

#### *Shrubs*

+·1 *Alnus incana*  
+·3 *Aronia floribunda*  
+·1 *Ilex verticillata*

+·3 *Rubus hispidus*  
+·3 *Taxus canadensis*

Herbaceous and other plants are given in the lists occurring throughout the description.

Areas examined: (1) Dumbell Lake area; (2) north of the highway near Carp river; (3) west of Pancake river and north of the highway.

A large area of the lowlands, lying for the most part between sandy or gravelly ridges, is occupied by a forest consisting mainly of black spruce and white cedar (Figures 15, 16). The trees are of small diameters, mostly under 6 inches, and not at all of regular height growth, ranging from a few feet in height to 50 or 60 feet for the spruce, with the cedar rarely above 30 feet, thus presenting a very irregular, and in many places open, canopy. Many of the spruce trees are now dead and fallen, and not a few have the appearance of being almost dead. Many of the living trees, particularly the cedars, are partly fallen, and stand obliquely with the terminals only upright and the lower branches rooting where these become overgrown with sphagnum, giving an appearance of abundant reproduction. These leaning trees and the abundance of fallen material, now practically completely covered, create a tangled mass of criss-crossing logs, which along with the vegetation gives to the lower levels of the forest a dense and luxuriant appearance. The accumulation of moss-covered logs provides a very uneven ground surface which is interrupted frequently by small pools of water surrounded by an abundance of mosses of numerous species. In addition, a usually plentiful shrubby and herbaceous vegetation in the more open places assists in making travel within this forest somewhat hazardous and painstakingly slow.

Although the forest is mainly black spruce and northern white cedar, there is a sparse admixture of the following secondary species:

*Abies balsamea* (L.) Mill. (leaves crowded to upper side of twigs).

*Larix laricina* (Du Roi) Koch (occasionally dead or with foliage stripped by the larch sawfly).

*Pinus Strobus* L. (usually dead at the top, with short foliage, extremely thick bark, and crooked trunks).

*Betula papyrifera* Marsh. (vigorous, but not plentiful).

Many of the spruce trees in the more open areas have become badly infected by *Arceuthobium pusillum* Peck. This parasite is particularly noticeable in the somewhat sparsely populated openings and gives to such infected trees a decided light yellow-green appearance, the "witch's brooms" being frequently the larger proportion of the tree.

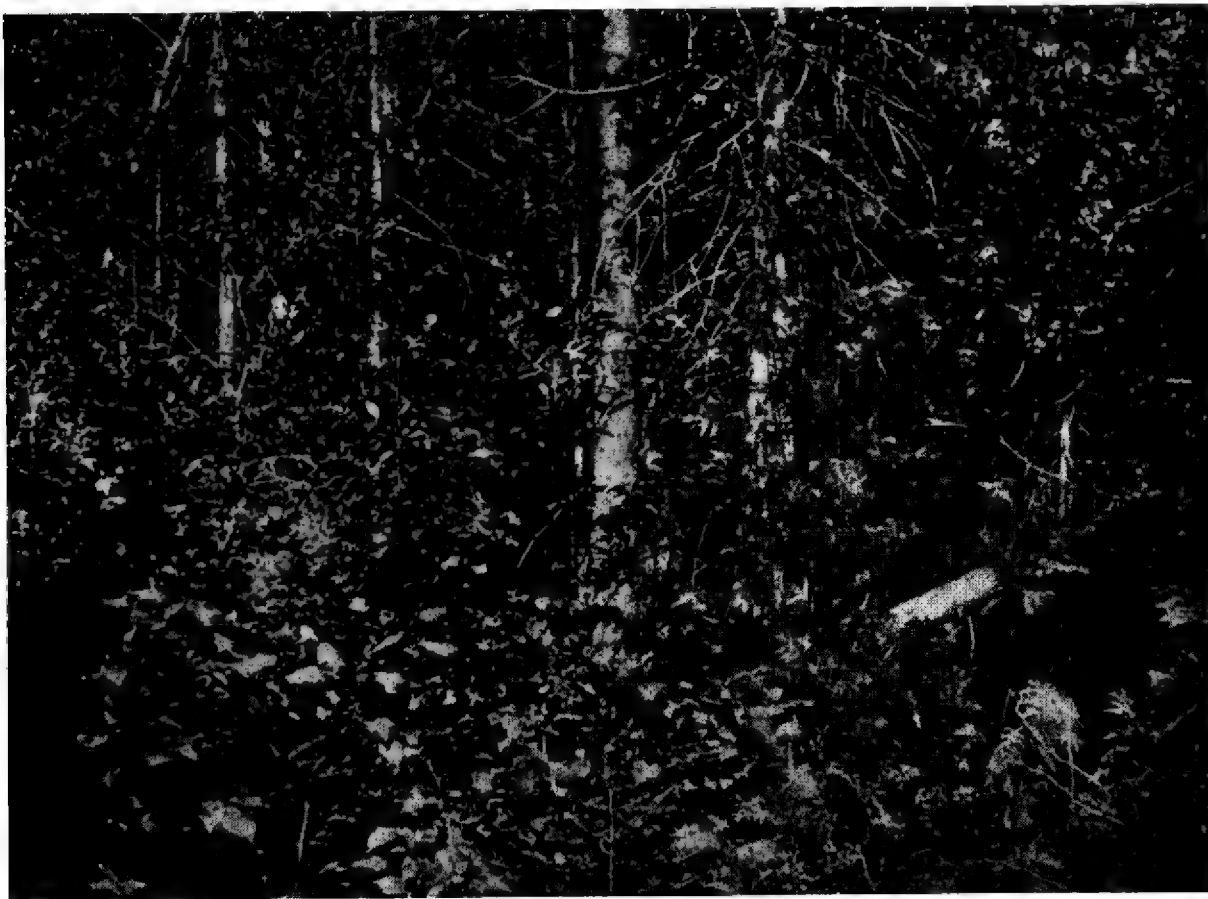
There is no definite high shrub stratum, but odd individuals or clumps of the species given in the stand list occur infrequently.

The ground vegetation is very variable in composition, consisting of a great variety of species which are more or less aggregated into several fairly definite communities. This variability is largely due to variations in the density of the stand and to differences in the water content of the soil. Samplings were, therefore, made in the well-shaded parts, in the open, and for visible differences in soil moisture. The following lists illustrate the vegetation occurring under different conditions of moisture in the wooded parts.



79822

Figure 15. Exterior view of spruce-cedar bog forest showing open sedge swamp in the foreground.



79857

Figure 16. Interior view of spruce-cedar bog forest.

In the moist and well-shaded areas:

<i>Sphagnum acutifolium</i> Ehrh.	<i>Smilacina trifolia</i>
<i>Lycopodium annotinum</i>	<i>Geocaulon lividum</i>
<i>Carex pauciflora</i>	<i>Ledum groenlandicum</i>
<i>C. rostrata</i>	<i>Chamaedaphne calyculata</i>

The sphagnum moss is abundant, but is fairly well hidden from view by the herbaceous plants. Scattered throughout there are also a number of less important species, such as:

<i>Equisetum arvense</i>	<i>Habenaria clavellata</i>
<i>E. palustre</i>	<i>H. dilatata</i>
<i>Eriophorum angustifolium</i>	<i>Drosera rotundifolia</i>
<i>Carex trisperma</i>	<i>Vaccinium Oxycoccus</i>
<i>Coptis groenlandica</i>	<i>Solidago uliginosa</i>

Surrounding the frequent pools of water that occur in these dark parts of the stand, and growing amongst a luxuriant growth of mosses and liverworts, are the following:

<i>Calamagrostis canadensis</i>	<i>Caltha palustris</i>
<i>Malaxis unifolia</i>	<i>Mitella nuda</i>

In the dry, well-shaded areas the sphagnum is largely replaced by feather mosses, and many of the plants found in the moist areas are rare if present at all. The following is a representative list of the species commonly occurring:

<i>Calliergon Schreberi</i> Willd.	<i>Rubus pubescens</i>
<i>Dicranum undulatum</i> Ehrh.	<i>Cornus canadensis</i>
<i>Hylocomium proliferum</i> L. Lindle.	<i>Pyrola rotundifolia</i> var. <i>americana</i>
<i>Hypnum</i> sp.	<i>P. secunda</i>
<i>Polytrichum commune</i> L.	<i>Gaultheria procumbens</i>
<i>Lycopodium clavatum</i>	<i>Chiogenes hispidula</i>
<i>Agrostis scabra</i>	<i>Vaccinium pennsylvanicum</i>
<i>Clintonia borealis</i>	<i>Melampyrum lineare</i>
<i>Spiranthes Romanzoffiana</i>	<i>Linnaea borealis</i> var. <i>americana</i>
<i>Goodyera repens</i> var. <i>ophioides</i>	

In the well-shaded but extremely wet, mucky areas where mosses are largely absent several species are very prominent:

<i>Glyceria canadensis</i>	<i>C. scabrata</i>
<i>Cinna latifolia</i>	<i>Caltha palustris</i>
<i>Carex gynocrates</i>	<i>Lycopus americanus</i>
<i>C. leptalea</i>	<i>Aster junceus</i>

The treeless areas are somewhat of the nature of open bogs, varying in size from several square yards to a few acres and supporting a great variety of plant species (Figure 17). In some of these openings there are shallow, mud-bottomed pools of water surrounded by a quaking peaty muck; in others the ground surface is quite a solid mat of moss overlying the black muck beneath.



79855

Figure 17. Open area in spruce-cedar bog forest.

In the shallow pools and surrounding them, and generally throughout the wettest places, the following species are conspicuous, growing amongst an almost continuous mat of mosses of which species of *Hypnum* and *Sphagnum* predominate:

*Sparganium minimum*  
*Glyceria borealis*  
*Scirpus hudsonianus*  
*S. subterminalis*  
*Eleocharis acicularis*  
*E. capitata*  
*Rhynchospora alba*  
*Carex exilis*  
*C. interior*  
*C. lasiocarpa*  
*C. leptalea*  
*C. livida*  
*C. Michauxiana*  
*Xyris montana*

*Juncus acuminatus*  
*J. stygius* var. *americanus*  
*J. brevicaudatus*  
*J. pelocarpus*  
*Tofieldia glutinosa*  
*Ranunculus reptans*  
*Cardamine pennsylvanica*  
*Sarracenia purpurea*  
*Drosera intermedia*  
*D. rotundifolia*  
*Parnassia americana*  
*Utricularia cornuta*  
*U. intermedia*  
*U. minor*

Many of the species from the above list may be found also scattered throughout the vegetation that gives character to the moist areas where deep sphagnum replaces the open water. Here there may be small patches of shrubbery or individual shrubs, such species as *Andromeda glaucophylla*,

*Ledum groenlandicum*, *Chamaedaphne calyculata*, *Kalmia polifolia*, *Potentilla fruticosa*, and *Lonicera oblongifolia* being particularly prominent, and in addition a variable vegetation of which the following is a typical list:

<i>Equisetum palustre</i>	<i>C. paupercula</i> var. <i>pallens</i>
<i>Triglochin maritima</i>	<i>C. angustior</i>
<i>Scheuchzeria palustris</i>	<i>C. stricta</i>
<i>Calamagrostis canadensis</i>	<i>C. scabrata</i>
<i>Glyceria canadensis</i>	<i>Juncus canadensis</i>
<i>Muhlenbergia uniflora</i>	<i>Habenaria clavellata</i>
<i>M. racemosa</i>	<i>H. dilatata</i>
<i>Eriophorum angustifolium</i>	<i>H. hyperborea</i>
<i>E. tenellum</i>	<i>H. lacera</i>
<i>E. virginicum</i>	<i>H. obtusata</i>
<i>Cladium mariscoides</i>	<i>Pogonia ophioglossoides</i>
<i>Rhynchospora fusca</i>	<i>Calopogon pulchellus</i>
<i>Carex canescens</i> var. <i>disjuncta</i>	<i>Arethusa bulbosa</i>
<i>C. canescens</i> var. <i>subloliacea</i>	<i>Listera cordata</i>
<i>C. exilis</i>	<i>Menyanthes trifoliata</i> var. <i>minor</i>
<i>C. flava</i>	<i>Lobelia Kalmii</i>
<i>C. gynocrates</i>	<i>Solidago graminifolia</i>
<i>C. limosa</i>	<i>S. uliginosa</i>
<i>C. oligosperma</i>	<i>Aster nemoralis</i>
<i>C. pauciflora</i>	<i>A. umbellatus</i>

It is evident from observations in the field that this association has undergone extensive changes as a result of logging operations and forest fires. Remnants of old haul-roads and of forest fires still remain, but probably the best evidence of an unstable condition is to be looked for in the lengthy lists of plants that now occupy the area. There is no doubt, however, that many of the open areas have been treeless for many years and that they can be considered as representative of the early conditions in the development of this type of forest.

Small areas of tamarack occur throughout the general spruce-cedar forest, and because of the change in foliage are very noticeable from the highway. The tamarack is mostly young, rarely over 40 feet in height and approximately 3 inches in diameter. A number of them were noticed to be almost defoliated by the larch sawfly, but many healthy trees are the rule. These clumps of trees suggest to the passing traveller that larch as a species of the forest is regaining prominence in this region.

The stands are all of very small extent and the influence from the spruce-cedar surroundings prevents any noticeable changes in the vegetation, which is not unlike that already described for the association as a whole.

## TALUS

A few miles inland from the lake shore where the hills rise in some cases over 1,000 feet above the lake level, there are numerous steep cliffs facing south and southeast (Figure 18), at the bases of which fallen rock material is accumulating. These cliff ledges and talus slopes provide fruitful areas for collecting plant material, many species that were not found elsewhere in the vicinity being collected from such locations.



At the base of the cliffs there are usually long slopes of rock fragments, which form a rugged mass of tightly wedged together, sharp-edged rocks. This broken rock material is composed of pieces of various sizes, some of them very large, and provides numerous rock faces, smooth rock surfaces, and crevices. In the crevices and smaller holes that have formed, where rainfall, gravity, and other agencies tend to aggregate the smaller rock materials, and at the base of the talus, a soil accumulates that in some places may be several feet in depth. There are, therefore, many different habitats very closely linked one with another, and as a result a very variable vegetation.



79881

Figure 18. View of Mamainse hill from the south.

Crustose and foliose lichens are common on the rocks, although the falling of fresh material each year provides many rocks that are not yet lichen covered. Usually along the base of the talus, and wherever a soil has formed, trees aggregate to form a forest (Figure 19). Higher up on the slope there are few trees, and frequently almost completely unpopulated areas.

Although a general description for these talus areas is scarcely possible, every one more or less differing from all others, there is, nevertheless, a striking similarity in the kinds of plants occupying them. The area northeast of Carp lake offers as good an example as any that could be chosen.

A range of hills running in an easterly direction lies approximately a quarter of a mile north of Carp lake, and extends northeast to Batchawana river. North of Carp lake these hills rise to an elevation of 1,100 feet above sea-level, being over 400 feet above the lake itself. The southwestern slopes which are the least abrupt are covered with a stand of red oak that has already been referred to (page 17). The south slopes are in many places very steep and sheered off practically vertically, with deep accumulations of broken rock along the base. Many of the rocks forming this talus and occurring particularly along its lower fringe are extremely large, one of the larger ones measured 18 by 15 feet by 12 feet high; generally, however, they are much smaller and more or less irregularly, but tightly packed together, with accumulations of gravel and soil in the crevices.



79841

Figure 19. Diabase and basalt talus, Batchawana river. A mixed forest growing up to the edge of the talus.

Along the base of the talus and in between the large rocks that have been carried beyond the base there is a scattering of trees, but between the rock face and the trees there is a wide area, in places 200 feet in width, where vegetation is very sparse and where trees that do get started are soon broken off by falling material and are able to continue only as a result of root suckers. Paper birch and red maple were two trees noted that are persisting on this exposed area by means of suckers from broken off stubs. At the very foot of the cliffs and here and there on the sheltered side of some very large pieces of rock there occurs a rather dense growth of plants, and

occasionally on a ledge high up on the face of the cliff may be seen a clump of vegetation, but the general aspect is that of a bare, rocky area. It is surprising, however, when one completes a thorough search over the whole area, to find that a great many species of plants do occur and are able to grow under such hazardous conditions.

Beginning with the rock face from which material is breaking away, the following species are found in the small cracks and on the ledges:

<i>Woodsia ilvensis</i>	<i>Pellaea glabella</i>
<i>W. oregana</i>	<i>Cryptogramma Stelleri</i>
<i>Cystopteris fragilis</i>	<i>Festuca occidentalis</i>
<i>Thelypteris fragrans</i>	<i>Carex eburnea</i>

Just at the foot of the rock face is a narrow section more or less sheltered from the falling material and covered with a very tangled mass of vegetation composed of the following species:

<i>Alnus incana</i>	<i>Parthenocissus quinquefolia</i>
<i>Clematis virginiana</i>	<i>Cornus alternifolia</i>
<i>Rubus Idaeus</i> var. <i>strigosus</i>	<i>Sambucus pubens</i>
<i>Celastrus scandens</i>	

On the relatively wide and apparently bare rock pile the following species occur in the crevices:

<i>Woodsia ilvensis</i>	<i>Aquilegia canadensis</i>
<i>Cystopteris fragilis</i>	<i>Arabis brachycarpa</i>
<i>Festuca occidentalis</i>	<i>Rhus glabra</i>
<i>Panicum lanuginosum</i>	<i>Symphoricarpos albus</i>

At the base of the talus, growing amongst the scattered trees and occurring frequently on the thin soil already formed on the tops of the larger rocks, are the following:

<i>Polystichum Lonchitis</i>	<i>Polypodium virginianum</i>
<i>Asplenium Trichomanes</i>	<i>Maianthemum canadense</i>
<i>Adiantum pedatum</i>	<i>Cornus canadensis</i>

Lichens and mosses cover many of the larger, lower rocks, but some of these are also covered over with ferns and other vegetation. *Polypodium virginianum* is a very common fern, covering almost completely some large rocks (Figures 20 and 21).

A few scattered trees continue to grow up the slope almost to the face of the cliff, and here and there lower down several tree species may aggregate in small clumps. The following trees were noted amongst the fragmentary stand:

<i>Picea glauca</i>	<i>B. papyrifera</i>
<i>Abies balsamea</i>	<i>Quercus borealis</i>
<i>Pinus Strobus</i>	<i>Sorbus americana</i>
<i>P. resinosa</i>	<i>Acer rubrum</i>
<i>Thuja occidentalis</i>	<i>Fraxinus americana</i>
<i>Populus tremuloides</i>	<i>F. lanceolata</i>
<i>Betula lutea</i>	

Paper birch and red maple are the most important trees. *Rubus Idaeus* var. *strigosus* and *Sambucus pubens* occur as the most important shrubs, but as yet there is no continuous vegetation except at the very base where the forest below encroaches on the talus.



79845 Figure 20. *Polypodium virginianum* growing at the foot of talus, Batchawana river.



79838 Figure 21. *Polystichum Braunii*, at base of talus, Chippewa river.

## VEGETATION ALONG STREAMS

Several streams drain into Batchawana bay, but during the summer months few of them are navigable by canoe for a distance of more than a few miles from the shores of lake Superior. Batchawana river is one of the largest streams entering the bay and over much of its course it is flowing through narrow valleys where the water is frequently shallow or very swift; only when it leaves the hill country and opens in to the lowlands situated within a few miles of the lake is it suitable for canoes. Carp (or Sable) river is also a swiftly flowing stream except for a distance of approximately a mile from the lake shore; for the most part it flows through narrow, deep ravines and cannot be travelled by canoe. West of the Carp, Pancake river is the only stream of any size until one passes Mamainse point, and it is little more than a creek during the summer months. These three streams were explored for purposes of collecting specimens and from the notes taken some idea of the vegetation along their banks may be gained.

The cliff-like ravines on Carp river, which are well above the water level and are not being eroded by water, are generally too steep and too insecure to support trees. For the most part they are well covered with mosses and liverworts; such genera as *Bazzania*, *Hedwigia*, *Hylocomium*, *Hypnum*, *Polytrichum*, and *Swartzia* were recognized, but undoubtedly other moss genera are represented. This bryophyte vegetation creates a very tough mat that clings to the rock faces, covering them completely. Rooted in the crevices and intermingling with the mosses and liverworts are many Pteridophytes. The noteworthy species are *Woodsia glabella*, *Cystopteris fragilis* var. *laurentiana*, *C. bulbifera*, *Thelypteris fragrans*, *T. Phegopteris*, *Polypodium virginianum*, and a few species of *Lycopodium*.

As the deep gorges formed by this river are usually very narrow, seldom 100 feet in width, the stream is well shaded by the trees growing on the upper margins of the cut. Drainage from above, seeping through the rock crevices, keeps the rock faces more or less continuously damp. The air in the ravine is, therefore, comparatively cool. Such conditions are favourable to a luxuriant development of these mosses, lichens, and ferns, which above all other plants provide the settings for the many beautiful scenes along the river. In addition there are many clumps of grasses and sedges and less commonly other herbaceous species; the principal plants other than Bryophytes and Pteridophytes, are:

*Poa glauca*  
*Elymus virginicus*  
*Trisetum spicatum*  
*Cinna latifolia*  
*Phalaris arundinacea*  
*Carex communis*  
*C. eburnea*

*Maianthemum canadense*  
*Listera cordata*  
*Thalictrum polygamum*  
*Ribes glandulosum*  
*Pyrola secunda*  
*Vaccinium ovalifolium*

Entering the main stream at intervals along the banks are small ravine brooks which are usually overshadowed by the foliage from overhanging trees and shrubs. The soil is deeper here and is very moist, usually even in those places where the brook may have dried up. The plant cover, therefore, contains many hydrophytic species. In places where the water is running, small pools are separated from one another by obstructions in the path of the stream, and in and around these pools there develops a pro-



fusion of mosses and liverworts. Such genera as *Mnium*, *Thuidium*, *Brachythecium*, *Dicranum*, and *Hylocomium* are abundantly represented. Ferns and seed plants occur along the banks of the little stream and are also plentiful. The following is a representative list:

<i>Botrychium virginianum</i>	<i>Clintonia borealis</i>
<i>Cystopteris bulbifera</i>	<i>Smilacina racemosa</i>
<i>Pteritis nodulosa</i>	<i>Maianthemum canadense</i>
<i>Thelypteris Dryopteris</i>	<i>Streptopus amplexifolius</i> var.
<i>T. Phegopteris</i>	<i>amerianus</i>
<i>T. noveboracensis</i>	<i>Cardamine parviflora</i>
<i>Polystichum Lonchitis</i>	<i>Ribes lacustre</i>
<i>P. Braunii</i>	<i>Geum macrophyllum</i>
<i>Athyrium angustum</i>	<i>Circaea alpina</i>
<i>Osmunda Claytoniana</i>	<i>Aralia racemosa</i>
<i>Equisetum arvense</i>	<i>Galium Claytoni</i>

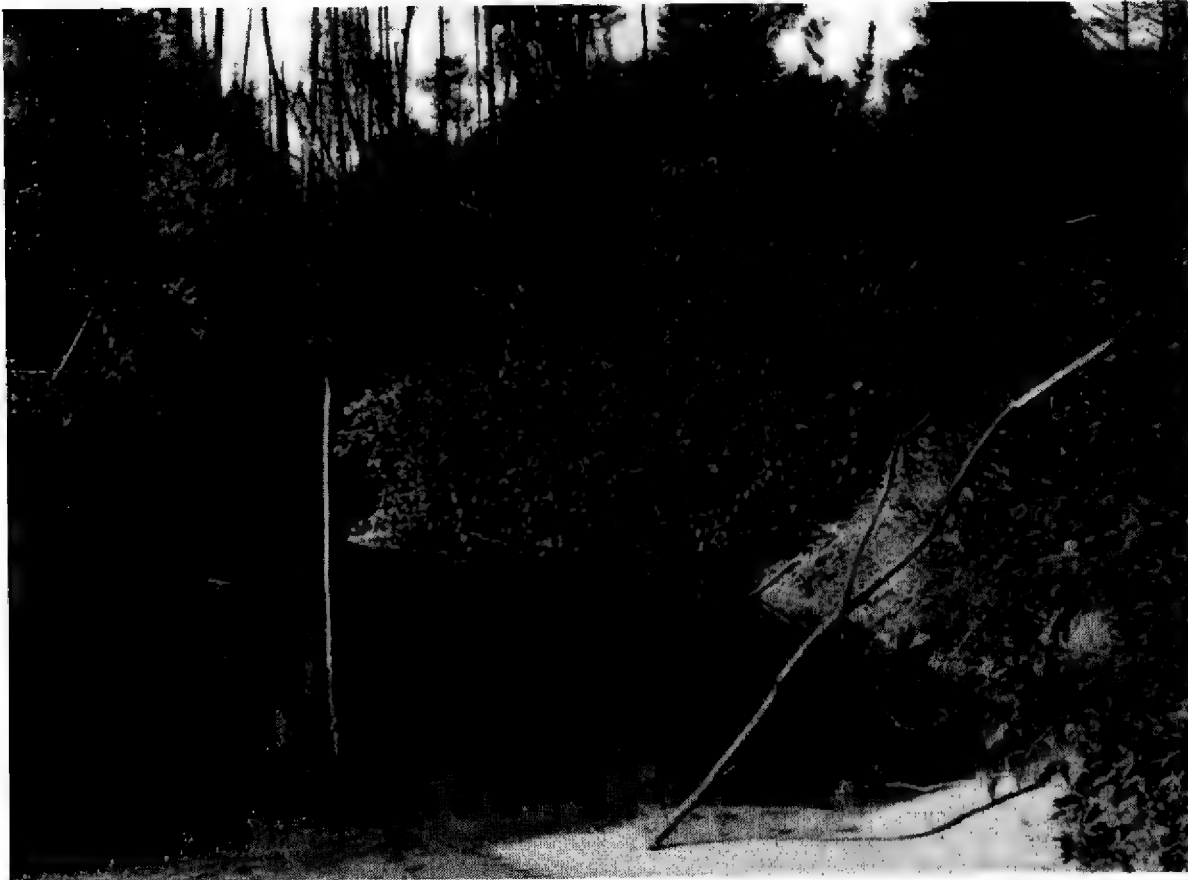
Batchawana river exhibits similar habitats to those found along Carp river, but within a few miles of the lake shore where the river flows through low-lying land there are numerous narrow marshy strips with a swamp type of vegetation. Sedges and grasses dominate, with a great variety of other species mingling with them and creating a very profuse growth usually approximately 3 feet in height and difficult to walk through. The following list is typical of such habitats:

<i>Bromus ciliatus</i> var. <i>genuinus</i>	<i>Spiraea latifolia</i>
<i>Glyceria canadensis</i>	<i>Rosa palustris</i>
<i>G. striata</i> var. <i>stricta</i>	<i>Impatiens biflora</i>
<i>G. grandis</i>	<i>Hypericum virginicum</i>
<i>Elymus virginicus</i>	<i>Heracleum lanatum</i>
<i>E. canadensis</i>	<i>Lysimachia terrestris</i>
<i>Calamagrostis canadensis</i>	<i>Mertensia paniculata</i>
<i>Scirpus atrocinctus</i>	<i>Scutellaria epilobiifolia</i>
<i>Carex projecta</i>	<i>Mentha arvensis</i> var. <i>canadensis</i>
<i>C. crinita</i> var. <i>gynandra</i>	<i>Galium asprellum</i>
<i>C. lasiocarpa</i>	<i>Campanula uliginosa</i>
<i>C. retrorsa</i>	<i>Eupatorium maculatum</i>
<i>Juncus brevicaudatus</i>	<i>Solidago canadensis</i>
<i>Iris versicolor</i>	<i>S. rugosa</i>
<i>Caltha palustris</i>	<i>Aster puniceus</i>
<i>Thalictrum polygamum</i>	<i>A. umbellatus</i>

Along the higher parts of this river there are numerous flat shores covered with smoothly polished stones (Figure 23) where a type of vegetation very similar to that occupying some parts of the lake shore occurs. Woody shrubs or trees and a few herbaceous plants are able to withstand the spring high water and persist for a time, although it is apparent that many are washed away annually. Among the great number of species that occur the following are the most prominent:

<i>Deschampsia flexuosa</i>	<i>Prunella vulgaris</i> var. <i>lanceolata</i>
<i>Allium Schoenoprasum</i> var.	<i>Diervilla Lonicera</i>
<i>sibiricum</i>	<i>Campanula rotundifolia</i>
<i>Populus tacamahacca</i>	<i>Solidago juncea</i>
<i>Salix lucida</i>	<i>Erigeron canadensis</i>
<i>Betula papyrifera</i>	<i>Anaphalis margaritacea</i>
<i>Alnus crispa</i>	<i>Chrysanthemum Leucanthemum</i>
<i>Prunus depressa</i>	var. <i>pinnatifidum</i>
<i>Acer spicatum</i>	<i>Artemisia caudata</i>
<i>Cornus stolonifera</i>	





79913

Figure 22. View of Pancake river showing overhanging vegetation.



79849

Figure 23. Gravel beach, Batchawana river, *Prunus depressa* in the foreground.

Along the banks of Pancake river trees and shrubs grow practically to the water's edge, so that the water is frequently shaded by the overhanging foliage (Figure 22). The shores are continuously more or less wet and are of a sandy or clay nature. The vegetation is very decidedly different from that described for the rocky ravines of Carp river. Very few mosses occur and ferns are not nearly as plentiful, whereas shrubby species and tall herbaceous plants are very abundant. The most conspicuous species include the following:

*Pteretis nodulosa*  
*Onoclea sensibilis*  
*Sagittaria latifolia*  
*Glyceria striata* var. *stricta*  
*Carex retrorsa*  
*Eriocaulon septangulare*  
*Juncus nodosus*  
*Iris versicolor*  
*Anemone quinquefolia* var. *interior*  
*Clematis virginiana*  
*Thalictrum dioicum*  
*T. polygamum*

*Physocarpus opulifolius*  
*Crataegus Douglasii*  
*Heracleum lanatum*  
*Mertensia paniculata*  
*Scutellaria lateriflora*  
*Chelone glabra*  
*Mimulus ringens*  
*Veronica americana*  
*Galium Claytoni*  
*G. asprellum*  
*Viburnum Opulus* var. *americanum*

### SAND BEACHES

Sand beaches are practically continuous around the shores of Batchawana bay, being interrupted in only a few places by rock outcrops (Figure 24).



79789

Figure 24. Sand beach, looking west from Pancake river.

There is near the water line a narrow strip that is washed over by the waves and on which no vegetation occurs. Bordering this is usually a much wider area that is free from wave action, at least during most of the growing season. Here the association of plants that develops is of great import-

ance in holding the drifting sand and in building up a soil on which a forest may later develop. In the formation of this community of plants the grass *Ammophila breviligulata* is the most abundant, and large colonies of this species occur along the shore. Due to its rhizome propagation it is very successful in preventing the removal of the sand. Associated with it are:

*Poa compressa*  
*Agropyron trachycaulum*  
*A. repens*  
*Deschampsia flexuosa*  
*Polygonella articulata*

*Prunus depressa*  
*Lathyrus japonicus* var. *glaber*  
*Hudsonia tomentosa*  
*Oenothera perennis*

This community (Figure 25) assists in collecting the drifting sand, thus building up ridges (Figure 26) that parallel the shore and cause to be formed towards the mainland lower areas that are frequently swampy. The low areas are of short duration, however, soon becoming filled up with moving sand which collects among a plentiful hydrophytic vegetation that develops there.



79792

Figure 25. Close up view of the beach community. *Ammophila breviligulata*, *Polygonella articulata*, *Lathyrus japonicus*, and *Hudsonia tomentosa* may be readily recognized.

The forest occurring along these sandy shores in some places extends to within a few feet of the water line, but usually there is a rather wide sand beach community and between it and the forest a more or less definite transitional area, where plants of the forest mingle with plants of the beach. Very frequently there is an accumulation of driftwood, consisting of pulpwood logs, old stumps, and smaller material, among which many different

shrubs and herbaceous plants occur. In addition to any of the species of the beach community, many of which may occur here, the following are frequently plentiful:

*Equisetum arvense*  
*E. laevigatum*  
*Lycopodium tristachyum*  
*Juniperus communis* var. *depressa*  
*J. horizontalis*  
*Smilacina stellata*  
*Polygonum Douglasii*

*Chenopodium album*  
*Apocynum androsaemifolium*  
*Melampyrum lineare*  
*Solidago hispida*  
*Aster lateriflorus*  
*A. longifolius*



79858

Figure 26. Sand beach on lake Superior, which lies to the left of the picture. Low ridge of sand separates the lake from the low area towards the mainland.

Just at the edge of the forest there is usually a fringe of shrubs and smaller trees, among which the following are prominent:

*Taxus canadensis*  
*Pinus Strobus*  
*Thuja occidentalis*  
*Populus tremuloides*  
*Salix* (various species)  
*Betula papyrifera*  
*Alnus incana*

*Amelanchier* (various species)  
*Acer spicatum*  
*A. rubrum*  
*Cornus alternifolia*  
*C. stolonifera*  
*Diervilla* *Lonicera*

On the exposed shores and generally wherever the shore-line is rocky the vegetation is of quite a different character. Heath-forming plants predominate, such genera as *Juniperus*, *Arctostaphylos*, and *Vaccinium* being prominent. Descriptions and lists of species occurring on these sites will be found in the discussion of succession.

## THE HYDROSERE

When viewing aerial photographs or a topographic map covering Algoma region, one is impressed with the rugged topography, the small number of lakes, and the infrequency of muskeg country in this section of Ontario. There are, however, surrounding or partly surrounding the majority of the lakes that do occur, small areas of bog. There are, also, within a few miles of the Lake Superior shore-line, and throughout much of the area covered in this report, fairly extensive lowlands occupied very largely by sphagnum moss and bog plants.

The alterations in the pre-glacial topography resulting from glacial action doubtless created many of the depressions, but the changing contour of the shore-line of lake Superior is still an important agent in the modification of the present vegetational development. This change is clearly evident in many places along the lake shore. In the protected bays through wave action the lake builds up sand-bars paralleling the shore-line. These gradually join up with the main land, cutting off long, narrow stretches of water a few yards in width, and forming lagoons which gradually change to sloughs through filling up with drifting sand and vegetation and eventually are populated with a bog-like vegetation, which later on disappears. The lowering of the lake level naturally assists in this process of forming new land. Evidently much of Batchawana Bay area has at some time been lake shore.

Wherever streams from the higher, rugged country farther inland enter lake Superior the current of the stream combines with the wave action of the lake in building up new land. Batchawana river offers a good example of the result of these two forces. This river for a distance of several miles from the lake shore meanders through the old deposits of Lake Algonquin, bringing with it a fine sediment which is being deposited in Batchawana bay. Across the mouth of the river sand-bars keep forming which dam up the flow of the water, diverting it into another channel and forming of the old river mouth a lagoon. This lagoon remains for a time as an open pond or small lake, but soon becomes a slough or a bog. Several of these lagoons, sloughs, and bogs, separated by low ridges of sand, are to be found east of the present river mouth, and there are many of them still in existence for several miles along the river, away from the present shore-line. The beginnings of a lagoon may be seen at the mouth of Pancake river.

As a secondary cause of bogs must be mentioned the beaver. This animal is still very active on many of the smaller lakes and streams and as a result of his activities there are created numerous areas now generally spoken of as beaver meadows (Figure 27). Undoubtedly the beaver has had an influence in the past in the development of many areas, but this influence has been largely an interruption in development solely because the beaver is a much sought after animal, and falling an easy prey to the trapper is not permitted for long to maintain himself in one place.

It is probable that the early vegetational development of the low-lying areas, whether resulting from the extinction of glacial formed lakes,



or as a result of delta formation and the creation of lagoons, or whether due to the gradual filling in of beaver ponds, is in many respects similar. No doubt intermediate conditions occur in which all of these agencies and others may be involved. In addition, the vegetation of the whole area has undergone extensive changes as a result of logging operations and forest fires (Figure 28).

The vegetation occurring on some of these delta formations and around a few inland lakes was studied and the probable developmental stages are here described as examples of the hydrosere.



79856

Figure 27. View of old beaver meadow as seen from the highway 3 miles west of Pancake river.

#### *Plant Communities of the Delta and Shore-line Deposits*

The vegetation along the shore-line of lake Superior shows considerable variation in the composition of the different plant communities, but there is evident everywhere a fairly uniform trend in its development. Studies were made around the mouth of Pancake river, at the mouth of Batchawana river, and at various other places along the lake shore and on the north side of Batchawana island. In addition, observations throughout the area farther inland have helped to support the following series of stages as being fairly typical.

*Aquatic Communities.* In water, usually not over 3 or 4 feet in depth, and comparatively free from wave and current action, there develops a vegetation largely composed of species of *Potamogeton*. These pond-weeds are rooted in the sand or mud bottoms with their stems and leaves floating. Generally they occur in small colonies in the sheltered bays, in



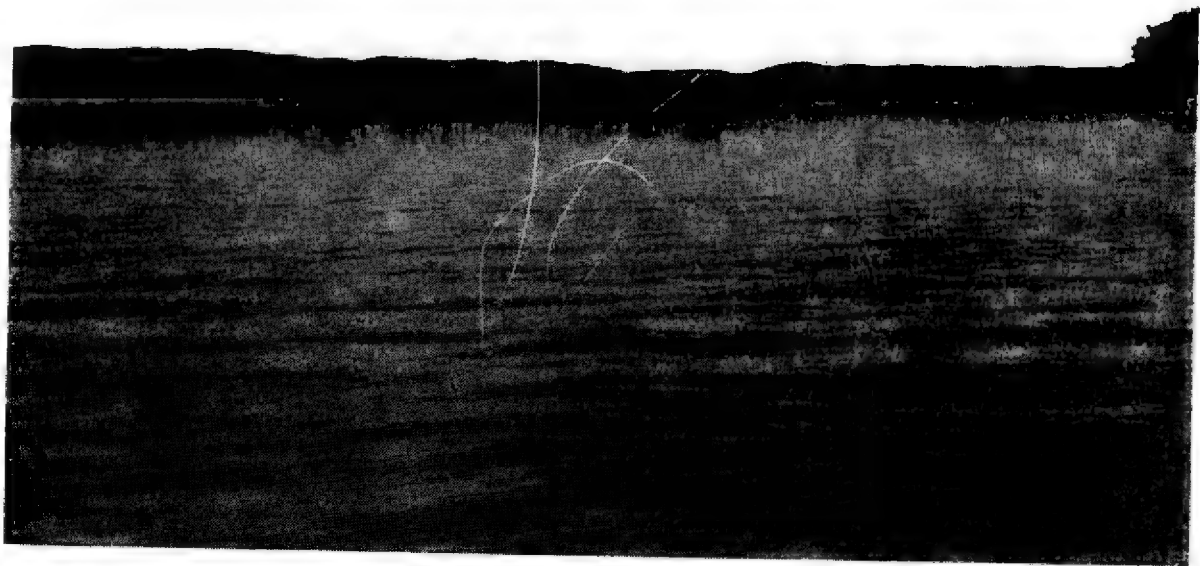
the quiet water of the rivers, in parts of the inland lakes, and in some of the lagoons. Their supple, flexible structure enables them to withstand what little wave or current action there is. Associating with them may be found the water milfoil, *Myriophyllum* sp., and the bladderwort, *Utricularia vulgaris*. In the well-sheltered, almost stagnant waters, *Brasenia Schreberi* may occur; one lagoon east of Batchawana river was found practically filled with this species.



79914

Figure 28. View of area bordering Pancake river, burned over in May 1935. Picture taken in September 1935.

*Reed Communities.* Wherever there are gently sloping shores, as is common along much of the lake shore, there are stands of reed-like plants (Figure 29). In some places one species appears in pure colonies (Figure 30), at other places two or more species more or less mixed together or occasionally forming into distinct zones. There are extensive areas of this stage of vegetation, particularly in all sheltered bays on the north side of Batchawana island and opposite the island on the Lake Superior shore. Large colonies of *Scirpus* are very prominent, the most usual species being *S. americanus*, *S. validus*, *S. Torreyi*, and *S. acutus*. Several large pure stands of *Phragmites communis* standing in 3 feet of water occur on the north side of Batchawana island (Figure 30). Species of *Eleocharis*, notably *E. palustris*, *Nymphozanthus variegatus*, and *Sparganium fluctuans*, may also form part of some of these communities. In general *Scirpus* and *Eleocharis* predominate, but to describe separate plant communities, or even separate zones within this stage of the vegetation would serve no useful purpose if such could be accomplished.



79900

Figure 29. Large stands of *Scirpus* in the bay opposite Batchawana island.



79907

Figure 30. Pure stand of *Phragmites communis* in 3 feet of water north of Batchawana island.

*Sedge-land Communities.* As the water shallows, due to physiographic and biotic agencies, the conditions become favourable for the entry of species that give a meadow-like aspect. Such communities occur in very many places on the low ground that is separated from the lake by narrow ridges of built up sand. There are many splendid examples on the north shores of Batchawana island where several samplings were made. The species recorded from these samplings forms an imposing list of sedges. To give any one sampling as typical of this stage of the succession would be totally inadequate. Any of the following species may be considered as primary, although their individual importance will vary in different communities.

<i>Dulichium arundinaceum</i>	<i>C. angustior</i>
<i>Eriophorum tenellum</i>	<i>C. interior</i>
<i>Scirpus atrocinctus</i>	<i>C. brunnescens</i>
<i>Eleocharis compressa</i>	<i>C. stricta</i>
<i>Rynchospora alba</i>	<i>C. flava</i>
<i>Carex scoparia</i>	<i>C. oligosperma</i>
<i>C. projecta</i>	<i>C. rostrata</i>
<i>C. Crawfordii</i>	

*Grass-land Communities.* The wet sedge lands eventually dry up due to the lowering of the lake level and to the building up of plant and other remains. One can usually find areas throughout the sedge-land community that have become relatively dry, and here are found plants that are not generally typical throughout the wetter parts. Among them will be a preponderance of grasses, usually so abundantly represented that other species are largely lost to view. The following is a list of species taken from three samplings on Batchawana island:

<i>Glyceria striata</i>	<i>C. rostrata</i>
<i>Poa compressa</i>	<i>Stellaria longifolia</i>
<i>P. pratensis</i>	<i>Potentilla palustris</i>
<i>Agropyron repens</i>	<i>P. fruticosa</i>
<i>Danthonia spicata</i>	<i>Epilobium densum</i>
<i>Calamagrostis canadensis</i>	<i>Lycopus americanus</i>
<i>Carex scoparia</i>	<i>Erigeron philadelphicus</i>
<i>C. vesicaria</i>	<i>Senecio aureus</i>

*The Shrub Stage.* Throughout the sedge lands and grass lands which are not always distinct from one another there usually occur shrubby species such as *Salix* (various species), *Ilex verticillata*, *Spiraea alba*, *Myrica Gale*, *Alnus incana*, and many others. In some places they occur as scattered individuals, but more often they form definite clumps or patches which will eventually merge one into another forming a definite shrubby area. On the edges of wet meadows it is not uncommon to find a zone of such shrubs, although frequently mingling with them will be found certain tree species, thus forming the beginnings of a swamp forest.

*The Swamp Forest.* Although different stages in the development of vegetation on delta deposits have thus far been presented as though one

succeeded another it is scarcely correct to consider the development as taking place in such an orderly fashion. Rather, these stages, or cross-sections of the succession, are so mingled with one another that in reality they do not exist as plant communities that must always form part of the development towards a forest, but are here separated for convenience in description. The early ones can be considered as being more or less distinct from the later ones, but with the entrance into an area of land plants there is usually a definite confusion of development, with plants of any so-called later stages entering at any convenient period. It is undoubtedly true that certain conditions must be built up before the forest trees are able to successfully populate a large area, but it is also true that they may enter the area far in advance of the coming of these conditions. In Batchawana area this confusion of development of the swamp forest is very definite and one finds mingling with the sedges and grasses such trees as *Larix laricina*, *Thuya occidentalis*, *Betula papyrifera*, *Acer rubrum*, and *Fraxinus nigra*. Usually such trees are infrequent and not growing well, but frequently they are shedding seed and seedlings of any of them may occur. They are, in some cases, though not in all, associated with clumps of shrubbery. Occasionally they become dense enough to more or less completely shade small areas. Beneath them can be found comparatively dry areas interrupted by small pools of water around which and in which are species similar to those growing in the open water along the lake shore. A complete list of plants for the forest should, therefore, include practically all of the species already referred to in discussing the hydrosere. As the forest develops towards a drier soil condition the pools become filled in and many of the early plants will be unable to continue, as also will be the case with many of the grasses, sedges, and shrubs, and patches of forest exhibiting this later condition are mingling at present with other patches that show a more primitive state. The vegetation is changing from a type that does well in a wet soil to the type of vegetation that one finds in many of the hardwood stands of the region. The following lists were made on Batchawana island on two areas of less than one acre each, and from them can be gained some idea of the very diverse and varied nature of the vegetation associating with the swamp forest.

## List one

*Onoclea sensibilis*  
*Thelypteris Dryopteris*  
*Lycopodium lucidulum*  
*Potamogeton gramineus*  
*Glyceria borealis*  
*Scirpus atrocinctus*  
*Carex scoparia*  
*Polygonum natans*  
*Ribes glandulosum*  
*Potentilla palustris*  
*Geum macrophyllum*  
*Circaea alpina*  
*Prunella vulgaris* var. *lanceolata*  
*Aster junceus*  
*Bidens cernua*

## List two

*Thelypteris Dryopteris*  
*Athyrium angustum* var. *rubellum*  
*Calamagrostis canadensis*  
*Cinna latifolia*  
*Juncus effusus*  
*Trillium cernuum*  
*Iris versicolor*  
*Actaea rubra*  
*Ranunculus pennsylvanicus*  
*Rubus pubescens*  
*Potentilla palustris*  
*Rosa palustris*  
*Ilex verticillata*  
*Menyanthes trifoliata*  
*Lycopus uniflorus*  
*Campanula uliginosa*

*Plant Communities of the Inland Lake Areas*

Although several inland lakes were visited for purposes of collecting and study, Dumbell lake has been chosen as a typical example and will be used for purposes of description. This lake is situated just off the north side of the highway, approximately  $3\frac{1}{2}$  miles west of Pancake River bridge.

It was possible here to see the early stages of the transformation of such lakes into low-lying, swampy areas (Figure 31). The lake is gradually filling up through the agencies of sedimentation and vegetation. No outlet from the lake was found, but there is probably considerable seepage through a ridge of sandy gravel which separates the lake on the west side from a large stretch of sphagnum-black spruce bog.



79830

Figure 31. Zoning of vegetation on west side of Dumbell lake. The *Eleocharis* and *Dulichium* zones are in the foreground.

Zones of vegetation are clearly marked from practically the centre of the lake outwards to the margin, and continuing somewhat more irregularly into the forest that encloses the whole area. The following five facies were easily distinguished:

The *Potamogeton* facies, the least distinct of all, occupies the deeper water some 50 feet out from the shore-line. The leaves of *Potamogeton natans* show floating on the water surface. Associated with it are *Nymphozanthus variegatus*, *Glyceria borealis*, and *Sparganium fluctuans*.

The *Eleocharis* facies, a belt approximately 20 feet in width of practically pure *Eleocharis palustris* var. *major*, growing in approximately a foot of water.



The *Dulichium* facies, practically pure dense *Dulichium arundinaceum* standing in a few inches of water and in places forming a zone 40 feet in width.

The *Carex* facies, a wide belt of principally *Carex lasiocarpa* and *C. oligosperma* mingling together. In the spring and autumn and at other times of high water this zone is probably submerged. At the time observed (July) the plants are practically out of water and one can walk throughout without sinking below the boot tops. Occasional species so definitely conspicuous in the first three facies also occur here, but the general aspect is that of pure *Carex*.



79832

Figure 32. Close-up view of shrub facies, Dumbell lake.

The shrub facies surrounds the lake and separates rather irregularly the first four zones from the forest, as may be seen in Figures 31 and 32. The principal shrubs are *Nemopanthus mucronata*, *Alnus incana*, *Myrica Gale*, *Chamaedaphne calyculata*, and *Andromeda glaucophylla*, and scattered among them are such plants as:

*Potamogeton* sp.  
*Glyceria borealis*  
*Carex lasiocarpa*  
*C. scabrata*

*Iris versicolor*  
*Lysimachia terrestris*  
*Utricularia intermedia*

Some small trees occurring here and there indicate the probability of a forest cover in the near future. *Picea mariana*, *Larix laricina*, *Thuja occidentalis*, *Abies balsamea*, *Betula papyrifera*, and *Acer rubrum* are present,



but the development from the shrub stage on is not readily determined and the succession would appear to continue in more than one direction. It would seem reasonable that differences in drainage will be responsible for the presence or absence of certain stages in this development. In some places a coniferous forest is assured and the spruce-cedar bog forest is in the making. As one ascends the low ridge on the west side of the lake the vegetation and the aspect suggest a mixed forest, but once over the ridge the sphagnum-bog forest of principally cedar and spruce is everywhere in evidence, and this is the type of forest that in general surrounds the smaller lakes of the region and which has already been described, pages 37 to 42.

### THE XEROSERE

The shore of lake Superior from Mamainse point to Mica bay is very rugged, due, according to Moore (14), to the eroding at different rates of the Middle Keweenaw lavas and the interbedded conglomerates, of which it largely consists. This rocky shore-line is exposed to the strong winds from the lake, and at intervals parts of it near the water line are washed over by the waves. As a result of this washing over, many low, hollow places and crevices become filled with water and debris that is frequently being removed from the smooth surfaces. Rainfall assists in this, making it possible during years of high precipitation for the larger depressions to retain water throughout the growing season. The shallower depressions and the crevices are, however, moist during only a part of the time, being dry or wet depending on the frequency of storms or rainfall. The smooth surfaces are wholly exposed to the sweeping winds, and are largely dependent for their moisture on dew or rainfall and the mists that roll in from the lake, with the result that they are frequently dry during several successive days.

The habitat conditions are, therefore, severe, and it is with difficulty that vegetation can maintain itself for any length of time. The smooth rock surfaces are the most exposed and only occasionally show signs of vegetation getting a start. Lichens and xerophytic mosses occur in various sized patches, gradually covering over the rocks by forming a mat-like structure of variable thickness and extent. Possibly the crustose lichens are the first to occupy the rock surfaces, although this is not everywhere apparent as foliose lichens and fruticose lichens are so frequently intermingled with them, and like them are also occurring in isolated patches. Xerophytic mosses are associated with the lichens; thus numerous lichens and mosses may be found occupying an area of a few square feet.

The development of this mat-forming vegetation would be largely ineffective were it not assisted by the plants that occupy the crevices and other places where materials can aggregate to retain some moisture. Many of the crevices are quite deep and well filled with an accumulation of roots, broken-up rock, and plant material, in which plants are able to become firmly rooted. The variety of species in the crevices is very great and many unexpected plants occur, although it is not uncommon to find smaller crevices occupied by only one species, or by only a few. Among the most important in

assisting in mat formation is *Juniperus horizontalis*, illustrated in Figure 33. This creeping shrub is frequently very abundant; rooted in a crevice with its straggling branches spreading out in all directions over the rock surfaces, it helps to bind together the mat structure. With it and in places of equal importance is *Arctostaphylos Uva-ursi*, the bearberry. *Potentilla tridentata* and *Deschampsia caespitosa* are important in filling up the crevices and are



79873

Figure 33. *Juniperus horizontalis* growing on basalt rock, Mamainse point.

much more abundant than either of the two shrubs, but their influence is confined largely to the crevice itself. Other noteworthy species growing in the crevices are:

*Woodsia ilvensis*  
*Thelypteris fragrans*  
*Athyrium angustum*  
*Selaginella rupestris*  
*Festuca ovina*  
*Poa glauca*  
*Agropyron trachycaulum* var. *novae-*  
*angliae*  
*Trisetum spicatum*  
*Muhlenbergia racemosa*  
*Oryzopsis pungens*  
*Carex capillaris* var. *elongata*  
*C. debilis* var. *Rudgei*  
*Corydalis sempervirens*  
*Saxifraga virginiensis*

*Potentilla fruticosa*  
*P. tridentata*  
*Vaccinium pennsylvanicum*  
*Primula intercedens*  
*Pinguicula vulgaris*  
*Campanula rotundifolia*  
*Solidago macrophylla*  
*S. Randii*  
*S. graminifolia*  
*Aster ptarmicoides*  
*Antennaria neodioica*  
*Anaphalis margaritacea*  
*Senecio pauperculus*  
*Hieracium canadense*

The vegetation occupying the depressions in which water frequently lies suggests the hydrosere and xerosere in combination. In these places some pools are occupied principally by hydrophytes, whereas others that evidently do not hold water continuously are occupied mainly by xerophytes. The pools are of importance in assisting in the development of the xerosere, as in them there usually develops a plentiful vegetation which assists in soil formation. The following list was compiled from a pool with scarcely 2 feet of water in it and nowhere more than 8 feet across, and is more or less typical of the majority of such habitats.

*Placodium* (particularly near the water showing red tops very brilliant). Numerous other lichens on the rocks.

*Dicranum* (sp.)

*Polytrichum commune* L.

*Swartzia montana* (Lamk.) Lindb.  
(and other undetermined mosses).

*Polypodium virginianum*

*Athyrium angustum*

*Deschampsia caespitosa*

*D. flexuosa*

*Danthonia spicata*

*Muhlenbergia racemosa*

*Scirpus caespitosus* var. *callosus*

*S. hudsonianus*

*Carex paupercula* var. *pallens*

*C. debilis* var. *Rudgei*

*Tofieldia glutinosa*

*Iris versicolor*

*Alnus incana*

*Drosera rotundifolia*

*Amelanchier Bartramiana*

*Potentilla tridentata*

*Andromeda glaucophylla*

*Vaccinium canadense*

*V. pennsylvanicum*

*Primula intercedens*

*Pinguicula vulgaris*

*Campanula rotundifolia*

*Lobelia Kalmii*

*Solidago Randii*

*Achillea Millefolium*

*Artemisia caudata*

*Senecio pauperculus*

It is apparent in many places that the forest may begin very early, even before the formation of a continuous mat over the rocks. The crevices and pools are of definite importance in providing a place where trees may start. By means of their spreading roots and branches they assist in the accumulating of material and in the building over of a mat of roots, leaves, and other debris that is forming. In many places there is thus a merging of seed plants, lichens, mosses, shrubs, and trees, and it is difficult to accede to the idea that such have had to pass through the stages usually ascribed to the xerosere. But whatever the early development may have been, whether of an orderly nature or not, there is eventually formed a heath-like mat which may or may not include trees. Amongst this vegetation many plants, including lichens and xerophytic mosses, may occur, but the general aspect is that of low shrubs, principally of the family Ericaceae. *Vaccinium* (several species) is usually abundant, although many large patches of *Arctostaphylos Uva-ursi* or *Melampyrum lineare* occur, and occasionally areas may be occupied by grasses, principally *Danthonia* and *Deschampsia*. The vegetation, therefore, is very variable; the principal species noted over a fairly wide area and in the more open parts are:

*Pteridium latiusculum*

*Juniperus communis* var. *depressa*

*J. horizontalis*

*Deschampsia flexuosa*

*Danthonia spicata*

*Cornus canadensis*

*Andromeda glaucophylla*

*Gaultheria procumbens*

*Epigaea repens*

*Vaccinium canadense*

*Melampyrum lineare*

*Solidago macrophylla*

Of the tree species, *Populus tremuloides*, *Betula papyrifera*, *Sorbus americana*, *Thuja occidentalis*, *Abies balsamea*, and *Picea mariana* occur, but in a very weathered condition, apparently growing very slowly, all being of very small diameters. One black spruce cut down with a pocket knife, 2 inches in diameter at the root, was over sixty years of age, but with rings so narrow that a definite count could not be made with a hand lens. Trees coming in elsewhere than in crevices are soon windthrown. Occasionally cedars may be found lying on the rocks, with roots still holding large patches of moss- and lichen-formed mat, some of them definitely down for several years but still alive, with some branches rooted and already developing into small trees. In the crevices, however, where trees come in they are able to get their roots well anchored, and although definitely not doing well are able to persist and resist the severe conditions. The importance of the crevices and holes in the rocks is, therefore, very definite. In many places it is doubtful whether any forest can gain a foothold and maintain itself, until breaking up of the rock and resulting crevices appear. The tree species that do occur are all important members of the northern coniferous forest, and the main stands of this forest have already been described, pages 34 to 42.

It is apparent from these brief descriptions of the hydrosere and the xerosere that the coniferous forest in this area may originate on either a dry situation or have its beginnings in a wet one. That the forests arising on dry, rocky areas will remain coniferous for protracted periods seems also more than probable. The northwestern section of the area studied is of a rocky nature with relatively thin soils, so that this type of forest may be expected to persist and maintain itself.

#### REFERENCES CITED

1. Aerial Survey, Lake Superior Coast (1931): Dept. of Lands and Forests, O.F.B.; map of Batchawana bay and Michipicoten harbour showing 50-foot contours, sheet 2.
2. Agassiz, Louis (1850): Lake Superior, Its Physical Character, Vegetation, and Animals. Boston, Mass.
3. Antevs, Ernst (1925): Retreat of the Last Ice-sheet in Eastern Canada; Geol. Surv., Canada, Mem. 146.
4. Bell, R. (1897): The Geographical Distribution of Forest Trees in Canada; Scot. Geog. Mag.: 281.
5. Braun-Blanquet, J. (1932): Plant Sociology; translation by Fuller and Conard, McGraw-Hill Book Co., New York.
6. Brodie, J.A., and Sharpe, J. F. (1930): The Forest Resources of Ontario; Dept. of Lands and Forests, O.F.B.
7. ——— (1933): Instructions for the Construction of Association Tables; Dept. of Lands and Forests, O.F.B. Unpub. report.
8. Christophersen, Erling (1925): Soil Reaction and Plant Distribution in the Sylene National Park, Norway; Trans. Conn. Acad. Arts and Sci.: 27.
9. Clements, F. E. (1905): Plant Succession; Carnegie Inst., Wash., Pub. 242.

10. Cooper, W. S. (1913): The Climax Forest of Isle Royale, Lake Superior, and Its Development; *Bot. Gaz.*, 55: 1, 2, and 3.
11. Gleason, A. H. (1924): The Structure of the Maple-Beech Association in Northern Michigan; *Papers Mich. Acad. Sci., Arts, and Letters*, 4.
12. Meteorological Service of Canada, Dept. of Marine: Unpublished records, Meteorological Office, Toronto.
13. Moore, Barrington, and Taylor, N. (1927): The Vegetation of Mount Desert Island, Maine, and Its Environment; *Brook. Bot. Garden, Mem.*, vol. 3.
14. Moore, E. S. (1926): Batchawana Area, District of Algoma; Dept. of Mines, Ont., 35th Ann. Rept., pt. 2.
15. Nichols, G. E. (1918): The Vegetation of Northern Cape Breton Island, Nova Scotia; *Trans. Conn. Acad. Arts and Sci.*, 22: 249.
16. ——— (1923): A Working Basis for the Ecological Classification of Plant Communities; *Ecology* 4: 11-23, 154-179.
17. Raup, H. M. (1935): Botanical Investigations in Wood Buffalo Park; National Museum of Canada, Bull. No. 74.
18. Sharpe, J. F., and Brodie, J. A. (1930): The Forest Resources of Ontario; Dept. of Lands and Forests, O.F.B.
19. Topographical Survey of Canada (1922): Dept. of the Interior: Map of Algoma, Sudbury, and Manitoulin Districts, Sault Ste. Marie Sheet.
20. Weather Bureau (1926): Summaries of Climatological Data for the U.S. by Sections. Section 61, Upper Peninsula of Michigan; U.S. Dept. Agric., Bull. W, 2nd edition 11, sections 31-68.
21. Weaver, J. E., and Clements, F. E. (1929): *Plant Ecology*. New York.
22. White, J. H. (1925): The Forest Trees of Ontario; Dept. of Lands and Forests, O.F.B.



## A CATALOGUE OF THE VASCULAR PLANTS

By T. M. C. Taylor

The sequence of the families and genera is that found in Engler and Gilg's "Syllabus der Pflanzenfamilien" (9th and 10th editions), except in the case of the Gramineae where Hitchcock's "Manual of the Grasses of the United States" is followed. As far as possible the nomenclature is according to the International Rules with synonyms included where the name employed departs from that in "Gray's New Manual of Botany" (7th edition). In these cases reference is also made to the literature where the grounds for the changes are discussed.

The writer is under obligation to a number of specialists who generously aided in the determination of certain groups. Thanks are due to Dr. M. L. Fernald for determining difficult specimens in *Potamogeton*, *Carex*, Gramineae, and Compositae; to Dr. F. W. Pennell who identified the specimens in the Scrophulariaceae; to Dr. J. H. Schaffner who examined all the *Equisetum* material; to Dr. H. K. Svenson who checked the specimens of *Eleocharis*; to Mr. C. A. Weatherby for his assistance with the Pteridophyta; and to Dr. K. M. Wiegand who determined the material of *Amelanchier* and *Eupatorium*. The writer is also glad to acknowledge his indebtedness to Mr. K. M. Mayall for his help in preparing and checking the details of the list. These require little comment. The abbreviations in brackets following each collection will be readily understood to indicate the state of development of the specimen. The numbers cited are the field numbers of the party.

## OPHIOGLOSSACEAE

**Botrychium matricariaefolium** A.Br.—*B. ramosum* (Roth) Asch.—*B. neglectum* Wood.

In grass on sand beach, Batchawana is., September 12, No. 18; in sand at edge of pine woods, Pancake bay, August 28, No. 19; in alder thicket near lake shore, Pancake bay, September 7, No. 20.

No. 19 is forma *gracile* (House) Weath. See Am. Fern Jour. 25: 49 (1935).

**Botrychium angustisegmentum** (Pease and Moore) Fern.—*B. lanceolatum* Auth. See Rhod. 17: 87 (1915).

In grass on sand beach, Batchawana is., September 12, No. 21.

**Botrychium multifidum** (Gmelin) Rupr.—*B. matricariae* (Schrank) Spreng.—*B. ternatum*, var. *intermedium* D. C. Eaton. See Am. Fern Jour. 25: 49 (1935).

Birch woods, Batchawana is., September 11, No. 256; low grassy places in sand behind beach, Sand pt., September 12, No. 257; in grassy clearing, Batchawana is., September 13, No. 255; swampy ground among black spruce, Pancake pt., August 16, No. 254; dry, sandy soil in open-grown poplars on highway 3 miles east of Pancake river, Pancake bay, August 23, No. 253.

In regard to No. 256 Mr. Weatherby says (in litt.) that it is "a puzzling form, perhaps best referred to *B. multifidum* but tending to break down the distinctions between that and *B. dissectum*."



**Botrychium virginianum** (L.) Sw.

Maple bush, Carp lake, July 25, No. 11; in rich soil under maples and yellow birch, Smith lake, July 23, No. 14.

**Botrychium virginianum**, var. **europaeum** Angstr. See Rhod. 19: 207 (1917).

Hill-side under poplars and birch, Corbeil pt., July 28, No. 9; damp hardwood bush on Carp ridge, Carp lake, August 2, No. 10; alder swamp, Pancake pt., July 17, No. 16; maple bush, Pancake bay, July 17, No. 17; deciduous woods, Batchawana falls, August 27, No. 13; mixed hardwoods, Batchawana is., September 10, No. 12; hardwood bush, Sault Ste. Marie, July 10, No. 15.

## POLYPODIACEAE

**Woodsia ilvensis** (L.) R. Br.

Lava crevices in the open sun, Carp ridge, Carp lake, August 2, Nos. 236, 234, 233; rock crevices on lake shore, Pancake pt., August 3, No. 235; rocky woods north of Dumbell lake, Pancake pt., July 15, No. 231; crevices in rock, Fawn hill, Pancake bay, July 31, No. 232; crevices of granite on east ridge, Havilland bay, August 12, No. 237; abundant on talus slope, Gros Cap, Sault Ste. Marie, July 11, No. 239; crevices of vertical lava face, elevation 1,700 feet, Mamainse mt., July 23, No. 238; crevices in conglomerate, Mamainse pt., July 13, Nos. 240, 241; crevices of rock faces, Batchawana falls, August 29, No. 242; crevices of granite on east ridge, Havilland bay, August 12, Nos. 251, 250; damp rocks, Carp river, September 6, No. 249.

**Woodsia glabella** R. Br.

Crevices of rock face, Batchawana falls, August 27, Nos. 248, 247.

**Woodsia oregana** D. C. Eaton.

Dry crevices in lava, Carp ridge, Carp lake, August 2, No. 246.

There is room for some slight doubt in this determination as the specific lines are hard to draw in this group.

**Woodsia Cathcartiana** B. L. Robinson.

Dry lava crevices on Carp ridge, Carp lake, August 2, No. 245; open talus, on Carp ridge, Carp lake, September 5, Nos. 244, 243.

Nos. 243, 244 are only tentatively assigned to this species, Mr. Weatherby has this comment to make (in litt.), "This is not *W. scopulina*. Habit is alright, but scales on lamina and long hair tips of indusial lobes are not. Habit is not good for *W. Cathcartiana* and there are more scales than I have hitherto seen in that species, but indusium is alright."

**Cystopteris fragilis** (L.) Bernh.

On Carp ridge, Carp lake, September 5, No. 2477; foot of granite face, 5 miles from mouth of Harmony river, September 3, No. 171; rock crevices, Batchawana falls, August 29, No. 170; damp granite crevices, Havilland bay, August 12, No. 175; damp granite crevices, Harmony River falls, September 3, No. 174; damp lava crevices, Batchawana falls, August 27, No. 173; in rock crevices at Fawn hill, Pancake pt., July 31, No. 176; in moss in damp lava crevices, Batchawana falls, August 27, No. 177; rock crevices north of Dumbell lake, Pancake pt., July 16, No. 180; damp rock crevices on Carp ridge, Carp lake, August 2, No. 179.

*No. 177* approaches forma *simulans* Weath.

**Cystopteris fragilis**, var. **laurentiana** Weath. See Rhod. 28: 130 (1926).

In canyon, Carp river, September 6, *No. 178*; damp lava crevices, Batchawana falls, August 27, *No. 172*; crevices on the face of damp rocks in canyon, Carp river, July 15, *No. 168*; wet lava crevices, Carp falls, Carp lake, September 7, *No. 169*.

This appears to be the first record of its presence in Lake Superior region, its only previous records from the Great Lakes area have been from Bruce county, Ont.

**Cystopteris bulbifera** (L.) Bernh.

Damp rock crevices in canyon, Carp river, July 15, *No. 167*; beside a stream on Carp ridge, Carp lake, September 5, *No. 166*; swampy woods, Batchawana falls, August 27, *Nos. 165, 164*; edge of spring in woods, Mamainse pt., July 13, *No. 163*.

**Pteretis nodulosa** (Michx.) Nieuwl.—*Onoclea struthiopteris* and *Matteuccia struthiopteris* Am. auth., not *Osmunda struthiopteris* L.

River bank, near mouth, Pancake river, September 4, *No. 121*; cedar swamp, Carp lake, July 25, *No. 120*; river bank, Pancake river, July 27, *No. 119*.

**Onoclea sensibilis** L.

Near river mouth, Pancake river, September 4, *No. 124*; wet sand, river mouth, Pancake river, July 27, *No. 123*; edge of swamp in muck soil, Agawa trail, Carp lake, July 23, *No. 122*.

**Thelypteris Dryopteris** (L.) Slosson.—*Phegopteris Dryopteris* (L.) Fée. See Rhod. 21: 179 (1919).

Damp soil in maple woods, Smith lake, July 23, *No. 202*; damp humus, Coppermine pt., September 2, *No. 201*; Batchawana is., September 9, *No. 200*; creek bank, Mamainse pt., September 2, *No. 199*; black ash swamp, Sault Ste. Marie, July 10, *No. 198*; in hardwoods, elevation 1,900 feet, Mamainse mt., July 18, *No. 227*.

**Thelypteris Phegopteris** (L.) Slosson.—*Phegopteris polypodioides* Fée. See Rhod. 21: 179 (1919).

Bank of canyon, Carp river, July 15, *No. 208*; damp soil, maple woods, Smith lake, July 23, *No. 207*; damp water's edge, Mamainse pt., July 13, *Nos. 205, 206*; wet humus in balsam-birch woods, Coppermine pt., September 2, *No. 204*; alder swamp, Batchawana is., September 9, *No. 203*.

**Thelypteris palustris** (Salisb.) Schott, var. **pubescens** (Lawson) Fern.—*Aspidium Thelypteris* (L.) Sw. in part. See Rhod. 31: 34 (1929).

Beaver meadow, Smith lake, July 25, *No. 189*; swamp, Batchawana is., September 10, *No. 188*; alder swamp, Batchawana is., September 9, *No. 187*.

**Thelypteris noveboracensis** (L.) Nieuwl.—*Aspidium noveboracense* (L.) Sw. See Am. Mid. Nat. 1: 226 (1910).

Low places in rich deciduous woods, Smith lake, August 15, *No. 191*; swampy ground at falls, Pancake river, July 31, *No. 190*.

**Thelypteris fragrans** (L.) Nieuwl., var. **Hookeriana** Fern.—*Aspidium fragrans* (L.) Sw. in part. See Rhod. 25: 3 (1923).

Crevices of lava, Mamainse mt., July 23, No. 197; granite crevices in partial shade, Harmony falls, September 3, No. 196; dry lava crevices, Mamainse mt., August 15, No. 194; crevices in rock face, Batchawana falls, August 29, No. 195.

**Thelypteris marginalis** (L.) Nieuwl.—*Aspidium marginale* (L.) Sw. See Am. Mid. Nat. 1: 226 (1910).

Rocky hardwood bush on ridge, Carp lake, August 2, No. 186; granite crevices on east ridge, Havilland bay, August 12, No. 185; crevices of granite, at falls, Harmony river, September 3, No. 184; lava talus, Mamainse harbour, September 2, No. 183; rocky hill-side, elevation 1,400 feet, Batchawana falls, August 29, No. 182; in hardwoods, Fawn hill, Pancake pt., July 31, No. 181.

**Thelypteris cristata** (L.) Nieuwl.—*Aspidium cristatum* (L.) Sw. See Am. Mid. Nat. 1: 226 (1910).

Swampy ground at edge of sphagnum bog west of beaver meadow, Pancake pt., July 23, No. 192; alder swamp, Batchawana is., September 9, No. 193.

**Thelypteris spinulosa** (O. F. Müll.) Nieuwl.—*Aspidium spinulosum* (Müll.) Sw. See Am. Mid. Nat. 1: 226 (1910).

Wet woods at edge of sphagnum bog, Pancake pt., July 25, No. 227; black spruce-sphagnum bog, Herrick tp., July 22, No. 220; low places in sandy woods, Sand pt., July 12, No. 218; wet coniferous woods, Batchawana is., September 9, No. 214; birch woods, Batchawana is., September 11, No. 212; Herrick tp., July 22, No. 219a.

In connexion with No. 219a Mr. Weatherby writes, "This specimen although otherwise an almost exact match for the other (No. 219, See below) is quite without glands and must be referred to *T. spinulosa*".

**Thelypteris spinulosa** (O. F. Müll.) Nieuwl., var. **intermedia** (Muhl.) Weath. See Rhod. 21: 178 (1919).

Batchawana is., Sept. 10, No. 210; hardwood bush near swamp, Batchawana is., Sept. 9, Nos. 211, 213; rocky woods at falls, Harmony river, September 3, No. 215; hardwood bush, Batchawana is., September 12, No. 216; damp hardwood bush on ridge, Carp lake, August 2, No. 221; damp soil in ravine, Smith lake, August 15, No. 222; hardwood bush, Carp lake, September 6, No. 224; hardwood bush on ridge, Carp lake, September 5, No. 225.

**Thelypteris spinulosa** (O. F. Müll.) Nieuwl., var. **americana** (Fisch.) Weath.—*Aspidium spinulosum* (Müll.) Sw., var. *dilatatum* (Hoffm.) Hook., f. *anadenium* Robinson. See Rhod. 21: 178 (1919).

Damp rocky woods on west slope, Mamainse mt., August 15, No. 229; hardwood bush, elevation 1,900 feet, Mamainse mt., July 18, No. 228.

**Thelypteris spinulosa** (O. F. Müll.) Nieuwl., var. **fructuosa** (Gilbert) Fern.—*Nephrodium spinulosum fructuosum* Gilbert. See Rhod. 28: 146 (1926).

Alder swamp, Batchawana is., Sept. 9, No. 209; cedar swamp, Pancake pt., August 22, No. 226; hardwood ridge, Batchawana falls, August 27, No. 223; black spruce-sphagnum bog, Herrick tp., July 22, No. 219; alder swamp, Corbeil pt., July 26, No. 217.

**Polystichum Lonchitis** (L.) Roth.

Thin soil and crevices of conglomerate outcrop, north of Dumbell lake, Pancake pt., July 15, No. 129; Carp lake, September 6, No. 2445; trap rock, elevation 900 feet, Gimlet Creek trail, Pancake bay, July 12, No. 128; rocky (lava) woods, Carp lake, August 2, No. 127; lava talus, Fawn hill, Pancake bay, July 31, No. 126; thin soil on lava, Batchawana falls, August 29, No. 125.

**Polystichum Braunii** (Spencer) Fée, var. **Purshii** Fern. See Rhod. 30: 30 (1928).

Wet rocks beside small stream, Batchawana falls, August 27, No. 138; damp rocky woods near top of east ridge, Havilland bay, August 13, No. 137; Carp ridge, Carp lake, September 5, No. 135; Pancake tote road, Corbeil pt., September 6, No. 136; mossy rock in maple woods, Carp lake, July 25, No. 134; damp, rocky woods on west slope, Mamainse mt., August 15, No. 133; rock woods below granite face, 6 miles from river mouth, Harmony river, September 3, No. 132; in woods among rooted lava talus, Smith lake, July 15, No. 131; creek bank near river, Batchawana falls, August 28, No. 130.

**Asplenium viride** Huds.

Damp lava crevices, Batchawana falls, August 27, No. 113.

**Asplenium Trichomanes** L.

Crevices of rocks, Batchawana falls, August 29, No. 112; shady talus slope, Gros Cap, July 11, No. 111; moist rock faces on east ridge, Havilland bay, August 12, No. 110; rock crevices at Fawn hill, Pancake bay, July 31, No. 108; talus slope of Carp ridge, Carp lake, July 25, No. 109; rock crevices north of Dumbell lake, Pancake pt., July 15, No. 107.

**Athyrium thelypteroides** (Michx.) Desv.—*Asplenium* (*Athyrium*) *acrostichoides* Sw.

Base of talus, Batchawana falls, August 29, No. 160; damp, shady valley, Batchawana falls, August 27, No. 161; damp depression in maple woods near summit, elevation 1,950 feet, Mamainse mt., July 18, No. 162; damp woods, Batchawana falls, August 30, No. 159.

**Athyrium angustum** (Willd.) Presl, var. **rubellum** (Gilbert) Butters.—*Asplenium* (*Athyrium*) *Filix-femina* of most Am. auth. in great part, not (L.) Bernh. See Rhod. 19: 193 (1917).

Black ash swamp, Sault Ste. Marie, July 10, No. 151; damp ground in maple woods, Smith lake, July 23, No. 150; open low ground in hardwoods on Carp ridge, Carp lake, August 2, No. 149; Batchawana is. September 9, No. 148; damp soil in maple woods, Smith lake, August 2, No. 154; spruce-cedar swamp, Pancake bay, August 7, No. 155; crevices of damp rock faces, Carp river, July 15, No. 153; birch woods, Batchawana is., September 11, No. 230; damp lava crevices, Mamainse pt., July 13, No. 158.

Of these No. 158 approaches f. *elegans* (Gilbert) Butters and No. 230 is close to var. *elatus* (Link) Butters.

**Athyrium angustum** (Willd.) Presl, var. **laurentianum** Butters.—*Asplenium* (*Athyrium*) *Filix-femina* of some Am. auth. in part, not (L.) Bernh. See Rhod. 19: 194 (1917).

Wet crevices almost at lake level, Mamainse pt., July 13, Nos. 156, 157.

Both these collections were of plants growing under very unfavourable conditions, in small lava crevices with scarcely any soil, thus lending colour to the suggestion that this variety is only a depauperate state of var. *rubellum*.

**Athyrium Filix-femina** (L.) Roth, var. *sitchense* Rupr. See Rhod. 19: 199 (1917).

Damp depressions at summit, elevation 1,950 feet, Mamainse mt., July 18, No. 152.

This record adds a new species to the ever increasing list of Cordilleran forms that have their centre of distribution west of the Rocky mountains with outliers in the region of the upper Great Lakes (See Fernald, Rhod. 37: 197 (1935).)

**Pellaea glabella** Mett.—*P. atropurpurea* (L.) Link of Am. auth. in part. See Am. Fern Jour. 7: 77 (1917).

Crevices of dry rock face, Batchawana falls, August 29, No. 115.

**Cryptogramma Stelleri** (Gmel.) Prantl.

Damp crevices on rock face, Batchawana falls, August 29, No. 114.

**Adiantum pedatum** L.

Damp rich woods, Batchawana falls, August 27, No. 118; hill-side, Batchawana falls, August 27, No. 117; low places in mixed hardwoods on Carp ridge, Carp lake, August 2, No. 116.

**Pteridium latiusculum** (Desv.) Hieron.—*Pteris aquilina* and *Pteridium aquilinum* Am. auth., not *Pteris aquilina* L. See Am. Fern Jour. 9: 43 (1919), and Rhod. 30: 13 (1928).

Open, rocky ground, Coppermine pt., September 2, No. 147; damp soil, cedar swamp, Smith lake, July 23, No. 146.

**Polypodium virginianum** L.—*P. vulgare* of eastern Am. auth., not L. See Rhod. 24: 141 (1922).

Rock ledge on Carp ridge, Carp lake, August 2, No. 145; crevices of lava, Mamainse pt., September 2, No. 144; in moss on lava, Batchawana falls, August 27, No. 143; mossy rocks, Mamainse pt., July 23, No. 142; granite crevices on east ridge, Havilland bay, August 12, No. 141; rock faces, Mamainse pt., July 13, No. 140; rocks, Elderberry hill, Pancake pt., July 17, No. 139.

#### OSMUNDACEAE

**Osmunda regalis** L., var. *spectabilis* (Willd.) Gray. See Rhod. 21: 176 (1919).

Swampy places, Pancake bay, July 13, No. 7; low ground, Batchawana is., September 10, No. 8; damp, peaty soil, Pancake pt., August 1, No. 6; marshy edge of lake, Carp lake, July 23, No. 5.

**Osmunda Claytoniana** L.

Damp woods, Batchawana falls, August 29, No. 4; cedar swamp, Carp lake, July 23, No. 3.

**Osmunda cinnamomea** L.

Spruce-tamarack swamp, Corbeil pt., August 8, No. 2; sphagnum bog, Pancake pt., July 15, No. 1.



## EQUISETACEAE

**Equisetum arvense** L.

In shallow water on muck bottom, Pancake pt., August 29, No. 79; sand beach, Pancake bay, July 16, No. 74; hardwood bush, Batchawana is., September 12, No. 76; in water between stones on gravel beach, Pancake bay, July 28, No. 75; poplar-birch slope, Pancake bay, July 28, No. 77; sand beach, Batchawana is., September 12, No. 81; swamp, Batchawana is., September 10, No. 78.

**Equisetum pratense** Ehrh.

Creek bank, Batchawana falls, August 28, No. 100.

**Equisetum sylvaticum** L., var. **pauciramosum** Milde. See Rhod. 20: 129 (1918).

Damp soil in woods, Batchawana bay, July 22, No. 96; damp clay near Smith lake, July 23, No. 95; damp hardwood bush on Carp ridge, Carp lake, August 2, No. 97; cedar swamp, Batchawana is., September 9, No. 98; birch woods, Batchawana is., September 11, No. 99.

**Equisetum palustre** L.

Common in wetter parts of sphagnum bog, Pancake pt., July 23, No. 83; swampy ground, Pancake pt., August 5, No. 82; damp sand, Harmony river, September 3, No. 80.

**Equisetum limosum** L.—*E. fluviatile* L. See Rhod. 23: 43 (1921).

In shallow water at edge of beaver pond, Sawpit bay, August 21, No. 90; common in wetter parts of sphagnum bog, Pancake pt., No. 89.

**Equisetum laevigatum** A. Br.

Sand beach, Pancake bay, July 16, No. 84; sand beach, Pancake bay, September 5, No. 104; dry sand beach, Pancake bay, July 22, No. 103.

Of these No. 104 shows the extreme fluctuation with blackened sheaths. Dr. Schaffner says (in litt.) that he has also seen this form on the northern peninsula of Michigan.

**Equisetum praealtum** Raf.—*E. robustum* A. Br., *E. hyemale* L., var. *robustum* (A. Br.) A. A. Eaton. See Am. Fern Jour. 11: 65 (1921).

Sand beach, Batchawana is., September 9, No. 87; damp hardwoods by stream on Carp ridge, Carp lake, August 2, No. 86; woods, Corbeil pt., September 6, No. 85; swampy woods, Batchawana falls, August 27, No. 88.

**Equisetum variegatum** Schleich.

Wet clay bank, Batchawana falls, August 27, No. 102; wet sand, Harmony river, September 3, No. 101.

**Equisetum scirpoides** Michx.

Damp hardwood bush on Carp ridge, Carp lake, August 2, No. 105; damp woods, Batchawana falls, August 27, No. 94; mixed coniferous woods, Coppermine pt., September 2, No. 93; moist river bank in shade, Batchawana falls, August 28, No. 92; moist bank, Pancake pt., July 15, No. 91.

## LYCOPODIACEAE

**Lycopodium lucidulum** Michx.

In cedar-yellow birch stand, Carp lake, July 25, No. 45; damp soil in woods, Mamainse pt., July 13, No. 44; Batchawana is., September 9, No. 46; poplar-birch slope, Pancake bay, July 28, No. 52; maple association, Smith lake, July 23, No. 51; hardwood bush on ridge, Carp lake, August 2, No. 50; hardwood ridge, Batchawana falls, August 28, No. 49; mixed hardwoods, Smith lake, August 15, No. 48; damp hardwood bush, Carp lake, August 2, No. 47.

No. 47 approaches closely to the variety following.

**Lycopodium lucidulum** Michx., var. **occidentale** (Clute) L. R. Wilson. See Rhod. 34: 169 (1932).

Spruce swamp, Sawpit bay, August 21, No. 53.

**Lycopodium inundatum** L.

Low places in sand, Sand pt., September 12, No. 43; sphagnum bog, Pancake pt., August 16, No. 42; boggy shore, Island lake, August 22, No. 41.

**Lycopodium annotinum** L. See Rhod. 17: 123 (1915).

Cedar swamp, Pancake bay, July 12, No. 24; Batchawana is., September 9, No. 29; birch-cedar swamp, Batchawana is., September 11, No. 28; moist hardwood bush, Pancake bay, July 12, No. 26; edge of sphagnum swamp, Pancake pt., August 5, No. 27; in deciduous woods, Smith lake, July 23, No. 25.

No. 24 approaches var. *acrifolium* Fern.

**Lycopodium clavatum** L.

Deciduous woods, Batchawana is., September 13, No. 33; Coppermine pt., September 2, No. 106; rich soil, mixed hardwoods, Smith lake, July 23, No. 32; on hill-side, poplar-birch stand, Pancake bay, July 29, No. 30; Batchawana is., September 9, No. 35.

No. 30 is mostly the formal variety *tristachyum* Vict.

**Lycopodium clavatum** L., var. **megastachyum** Fern. and Bissell. See Rhod 12: 53 (1910).

In open-grown poplar stand, Corbeil pt., July 31, No. 31; sand beach under pines, Pancake bay, September 5, No. 34.

**Lycopodium obscurum** L.

Deciduous woods, Batchawana is., September 13, No. 58; Batchawana is., September 11, No. 59; maple association, elevation 1,850 feet, Mamainse mt., July 23, No. 57; open-grown poplar stand, Corbeil pt., July 31, No. 56; poplar-birch slope, Pancake bay, July 28, No. 55; maple association, Pancake pt., July 15, No. 54.

**Lycopodium complanatum** L.

Dry mixed woods, Pancake pt., August 16, No. 38; sandy woods, Sawpit bay, August 21, No. 37; sand beach under pines, Batchawana bay, July 24, No. 36; sandy woods, Sand pt., September 12, No. 60.

**Lycopodium complanatum** L., var. **canadense** Vict. See Contrib. Lab. Bot. Univ. de Montréal, No. 3: 70 (1925).

Open pine woods, Coppermine pt., September 2, No. 40.

**Lycopodium complanatum** L., var. **elongatum** Vict. See Contrib. Lab. Bot. Univ. de Montréal, No. 3: 72 (1925).

In sandy soil, open pine-vaccinium woods, Coppermine pt., September 2, No. 39.

**Lycopodium tristachyum** Pursh.

Sand beach, Pancake bay, July 22, No. 63; sandy woods, Sand pt., September 12, No. 62; sand beach under pines, Pancake bay, August 22, No. 61.

#### SELAGINELLACEAE

**Selaginella selaginoides** (L.) Link.

Sphagnum swamp, Pancake pt., August 16, No. 23; wet mossy hummocks in bog, Pancake pt., August 5, No. 22.

**Selaginella rupestris** (L.) Spring.

In shallow soil over granite, Havilland bay, August 12, No. 70; sandy soil, Pancake bay, July 22, No. 71; in soil at top of cliff, Gros Cap, July 11, No. 72; slope of Keweenaw conglomerate, Mamainse pt., July 13, No. 73.

#### ISOËTACEAE

**Isoetes Braunii** Dur.—*I. echinospora* Dur., var. *Braunii* (Dur.) Engelm. See Ann. Mo. Bot. Gard. 9: 156 (1922).

Immersed in shallow, mud-bottomed lagoon, Batchawana river, July 31, No. 65; emerged at edge of muddy pond, Sawpit bay, August 21, No. 66; immersed in 8 inches of water in decayed organic debris in river lagoon, Pancake bay, August 10, No. 67; in mud and gravel in 1 foot of water, Batchawana is., September 10, No. 69; emerged in mud in beaver meadow, Batchawana falls, August 27, No. 68; shallow water in mud, Harmony river, September 8, No. 64.

#### TAXACEAE

**Taxus canadensis** Marsh.

Beach, Batchawana is., September 13, No. 2446; mixed woods, Pancake river, July 16, No. 2448; Sawpit bay, August 19, No. 261; mixed woods, Pancake bay, September 7, No. 260; maple woods, Smith lake, July 23, No. 259.

#### PINACEAE

**Picea glauca** (Moench.) Voss.—*P. canadensis* (Mill.) B.S.P. See Rhod. 17: 59 (1915).

Thin soil on lava, Mamainse harbour, September 2, No. 277; sandy beach, Pancake bay, August 22, No. 276.

**Picea mariana** (Mill.) B.S.P.

Old Agawa trail, Carp lake, September 5, No. 278.

**Tsuga canadensis** (L.) Carr.

Mixed woods, Batchawana is., September 12, No. 2447; river bank, Batchawana falls, August 28, No. 266; thin soil on granite on ranger trail 6 miles north of highway, Harmony river, September 3, No. 265; near provincial highway, Harmony river, August 13, No. 264.

**Abies balsamea** (L.) Mill.

Mouth of Batchawana river, August 30, *No. 255*; Carp lake, September 5, *No. 254*; exposed rock crevices, elevation 1,900 feet, Mamainse mt., July 18, *No. 253*.

**Larix laricina** (Du Roi) Koch.

Old Agawa trail, Carp lake, September 5, *No. 263*; bog, Batchawana is., September 10, *No. 262*.

**Pinus Strobus** L.

Sand beach, Pancake bay, August 22, *No. 256*.

**Pinus resinosa** Ait.

Thin soil over granite on east ridge, Havilland bay, August 12, *No. 258*; sand beach, Pancake bay, August 22, *No. 257*.

**Thuja occidentalis** L.

Base of lava talus, Batchawana falls, August 29, *No. 275*; swamp, Batchawana is., September 10, *No. 274*; rocky crevices, elevation 1,900 feet, Mamainse mt., July 18, *No. 273*; mixed woods near highway, Pancake river, July 17, *No. 272*.

**Juniperus communis** L., var. **depressa** Pursh.

Sandy beach, Pancake bay, August 22, *No. 268*; thin rocky soil, Mamainse pt., July 13, *No. 267*.

**Juniperus horizontalis** Moench.

Slope of lava rocks, Mamainse pt., July 13, *No. 271*; thin soil on rocky shore, Pancake pt., August 3, *No. 270*; sandy soil, Coppermine pt., September 2, *No. 269*.

## TYPHACEAE

**Typha latifolia** L.

Wet places in beaver meadow, Pancake pt., August 1, *No. 710*; swamp, Batchawana is., September 11, *No. 709*.

## SPARGANIACEAE

**Sparganium chlorocarpum** Rydb.—*S. diversifolium* Am. auth., not Graebner. See Rhod. 24: 26 (1922).

Shallow water in soft mud, Island lake, August 22, *No. 719* (fr. no ♂ fl.).

**Sparganium chlorocarpum** Rydb., var. **acaule** (Beeby) Fern.—*S. simplex*, var. *acaule* Beeby, *S. diversifolium*, var. *acaule* Fern. and Eames. See Rhod. 24: 26 (1922).

Beaver meadow, Pancake pt., July 17, *No. 717* (♂ fl., ♀ fl.); muddy ground in beaver meadow, Pancake pt., July 23, *No. 718* (fr., ♂ fl.); beaver meadow, Batchawana falls, August 29, *Nos. 720, 721* (fr.); in wet mud, Sawpit bay, August 21, *Nos. 722, 725* (fr., no ♂ fl.); in low ground, Xyris swamp, Pancake pt., August 21, *No. 723*, (fr. ♂ fl.); damp sand at margin of small stream, Pancake pt., *No. 724* (fr., no ♂ fl.).

**Sparganium fluctuans** (Morong) Robinson.

In 2 feet of water near river mouth, Batchawana river, July 31, *No. 711* (fr., ♂ fl.); in 2 to 3 feet of water, Dumbell lake, Pancake pt., July 15, *No. 716* (fr. no ♂ fl.).

**Sparganium minimum** Fries.

Shallow pools in sphagnum, Xyris swamp, Pancake pt., August 16, No. 712 (fr., no ♂ fl.); swampy ground, Sawpit bay, August 21, No. 713 (fr., ♂ fl.); in 2 feet of water, Dumbell lake, Pancake pt., July 15, No. 714 (fr., ♂ fl.); in 2 feet of water, in stagnant pond, Sand pt., September 12, No. 715 (fr., no ♂ fl.).

## NAJADACEAE

**Potamogeton natans** L.

In 2½ feet of water in Dumbell lake, Pancake pt., July 15, No. 295 (fl., fr.); shallow water, Island lake, August 22, No. 296 (fl.); in 2 feet of water in pond, Sand pt., September 12, No. 298 (fl.).

**Potamogeton Oakesianus** Robbins.

In very shallow water and on mud in swamp, Pancake pt., August 1, No. 303 (fl.); in 18 inches of water in pond, Sand pt., September 12, No. 297 (lv.).

**Potamogeton epihydrus** Nutt., var. **Nuttallii** (Cham. and Schlecht) Fern.—Mem. Gray Herb. III: 117 (1932).

Sand-bottomed pool in 8 inches of water, Black creek, Batchawana bay, July 24, No. 282 (yng. fr.); in 6 inches of water, Pancake lagoon, August 10, No. 283 (fr.); in 8 inches of water over mulch in beaver meadow, Carp lake, July 25, No. 284 (fl.); in 1 foot of water in stagnant pond, Sand pt., September 12, No. 285 (fr.); in 2 feet of water at mouth of Harmony river, September 18, No. 286 (lv.); shallow pond, Sawpit bay, August 21, No. 287 (fr.).

**Potamogeton tenuifolius** Raf., var. **subellipticus** Fern.—*P. alpinus* Am. auth. in large part, not Balbis. See Rhod. 33: 211 (1931).

Shallow stream in beaver meadow, Batchawana falls, August 27, No. 294 (fr.).

**Potamogeton amplifolius** Tuckerm.

Above bridge, Pancake river, July 27, No. 280 (fl.).

**Potamogeton gramineus** L., var. **graminifolius** Fries.—*P. heterophyllus* of most recent Am. auth., not Schreb. See Rhod. 23: 189 (1921).

In shallow water near mouth, Carp river, July 24, Nos. 281, 291 (fl.); in 18 inches of water in stagnant pond, Sand pt., September 12, No. 304 (lv.); shallow water, Havilland bay, August 13, Nos. 305, 306 (fl.); shallow water, Batchawana is., September 10, No. 307 (fl.); shallow water, Sawpit bay, September 18, No. 308 (fl.).

**Potamogeton Richardsonii** (Benn) Rydb.

In 2 feet of quiet water near river mouth, Carp river, July 24, No. 293, in 8 to 12 feet of water, Harmony bay, September 18, No. 300 (fl., fr.); in shallow water over sand, Batchawana is., September 10, Nos. 301, 302 (fr.).

**Potamogeton pusillus** L., var. **typicus**. See Mem. Gray Herb. III: 81 (1932).

In 2 feet of water in stagnant pond, Sand pt., September 12, No. 292 (lv.).

**Potamogeton spirillus** Tuckerm.—*P. dimorphus* of authors in part, not Raf.

Shallow water in lagoon, Pancake river, September 18, No. 289 (fr.); shallow water in lagoon, Pancake river, August 10, No. 290 (lv.).



**Najas flexilis** (Willd.) Rostk. and Schmidt.

Shallow water at mouth of Harmony river, September 3, *No. 309* (fr.).

#### JUNCAGINACEAE

**Triglochin maritima** L.

Swampy places, Xyris swamp, Pancake pt., August 16, *No. 625* (fr.); in sphagnum in Xyris swamp, Pancake pt., August 16, *No. 624* (fr.).

**Scheuchzeria palustris** L., var. **americana** Fern. See Rhod. **25**: 177 (1923).

Wet peaty swamp, Pancake pt., August 16, *No. 310* (fr.).

#### ALISMACEAE

**Sagittaria latifolia** Willd.

Just above the highway bridge, Pancake river, September 4, *No. 319* (fr.); shallow water, Havilland bay, August 13, *Nos. 317, 318* (fr.); muddy shore, Carp lake, August 2, *No. 316* (fl.); shallow, mud-bottomed bay near mouth of Batchawana river, July 31, *No. 314* (fl.); shallow water at mouth of Carp river, July 29, *No. 313* (fl.); in sand at river's edge above the highway bridge, Pancake river, July 27, *No. 312* (fl.); in 3 inches of water in mud near river mouth, Pancake river, August 10, *No. 311* (fl.).

**Sagittaria cuneata** Sheldon.—*S. arifolia* Nutt.

In 3 inches of water in mud, Cross lake, July 25, *No. 315* (fl.); shallow water in beaver meadow, Batchawana falls, August 29, *No. 320* (fl.).

**Sagittaria cristata** Engelm.

Shallow water in quiet bay, Batchawana is., September 10, *No. 321* (lv.).

#### HYDROCHARITACEAE

**Vallisneria americana** Michx.—*V. spiralis* Am. auth., not L. See Rhod. **20**: 108 (1918).

In mud in 1 foot of water, Batchawana is., September 10, *No. 1455* (fl.).

**Elodea canadensis** Michx.

Floating in quiet bay, Batchawana is., September 11, *No. 1453* (lv.); in 1 foot of water, Pancake river, September 18, *No. 1454* (lv.).

#### GRAMINEAE

**Bromus ciliatus** L., var. **genuinus**. See Rhod. **32**: 70 (1930).

Near river bank, August 30, *No. 980*; roadside, Pancake bay, July 31, *No. 981*; Carp lake, August 2, *No. 982*; moist, clay soil, alders, Pancake road, 2 miles east of camp, Corbeil pt., August 7, *No. 983*; shore, Batchawana is., August 12, *No. 985*; damp, wooded bank, Batchawana falls, August 27, *No. 986*.

**Bromus ciliatus** L., var. **intonsus** Fern. See Rhod. **32**: 70 (1930).

Humus in ravine (balsam-birch cover), Coppermine pt., September 2, *No. 987*; open-grown poplar, Corbeil pt., July 31, *No. 984*; open rocks in woods, Harmony river, August 13, *No. 979*.

**Festuca occidentalis** Hook.

Dry, rocky soil on ridge, Carp lake, August 2, *No. 1045*.

**Festuca ovina** L.

Lava crevices, Mamainse pt., July 13, No. 1042; lava crevices, Mamainse pt., September 2, No. 1043; sandy woods, Pancake bay, July 22, No. 1044.

**Glyceria borealis** (Nash) Batch.

Shallow water, Havilland bay, August 13, No. 1047; shallow water, Dumbell lake, July 15, No. 1048; shallow, sand-bottomed pool, Black creek, Batchawana bay, July 24, No. 1049.

**Glyceria canadensis** (Michx.) Trin.

Swamp, Batchawana is., September 10, No. 1051; cedar-spruce association, Pancake pt., August 7, No. 1052; low ground, Sawpit bay, August 21, No. 1053; open water, Dumbell lake, Pancake pt., July 15, No. 1054; alder swamp, Corbeil pt., July 26, Nos. 1055, 1056; wet sand near creek, on beach, Pancake bay, July 22, No. 1057; black spruce-sphagnum bog, Herrick tp., July 22, No. 1058.

**Glyceria canadensis** (Michx.) Trin., var. **laxa** (Scribn.) Hitchc. See Am. J. Bot. 21: 128 (1934).

Swamp, Corbeil pt., August 8, No. 1059.

**Glyceria striata** (Lam.) Hitchc.—*G. nervata* (Willd.) Trin. See Proc. Biol. Soc. Wash. 41: 157 (1928).

Birch woods, Batchawana is., September 11, No. 1063; wet places, Pancake pt., August 1, No. 1064; damp ground in woods, Corbeil pt., July 29, No. 1065; wagon road, Mamainse pt., July 25, No. 1068; alder swamp, Corbeil pt., July 26, No. 1069; damp ground, Mamainse road, July 22, No. 1070; maple woods, Batchawana falls, August 27, No. 1071; maple woods (moist depression), Mamainse mt., August 13, No. 1072; alder swamp, Corbeil pt., August 3, No. 1073; black ash swamp, Sault Ste. Marie, July 10, No. 1061.

**Glyceria striata** (Lam.) Hitchc., var. **stricta** (Scribn.) Fern. See Rhod. 31: 47 (1929).

River mouth, Carp river, July 29, No. 1075; Batchawana falls, August 27, No. 1076; mud, Pancake river, August 10, No. 1077; roadside ditch, Carp river, July 31, No. 1078; maple association, Pancake bay, July 13, No. 1079.

**Glyceria grandis** S. Wats.

Swampy place, Batchawana village, August 14, No. 1060.

**Glyceria Fernaldii** St. John.

Damp, sandy roadway, Carp lake, July 23, No. 1066; beaver meadow, Pancake bay, August 1, No. 1067.

**Poa annua** L.

Roadside, Mamainse pt., September 2, No. 1142.

**Poa compressa** L.

Shore meadow, Pancake bay, August 14, No. 1137; damp sand, Pancake bay, August 10, No. 1138; sandy beach, Pancake bay, July 16, No. 1139; low places, Sand pt., September 12, No. 1140; sandy beach, Pancake bay, July 22, No. 1143; gravelly soil, Batchawana village, August 14, No. 1141.

**Poa pratensis** L.

Roadside clearing, Sawpit bay, August 21, No. 1131; sandy clearing, Pancake camp, Pancake river, July 12, No. 1132; hardwoods, Batchawana is., September 10, No. 1133.

**Poa pratensis** L., var. **angustifolia** (L.) Sm.—*P. angustifolia* L. See Hegi, Ill. Fl. Mitt. Eur. 1: 307.

Batchawana village, August 14, No. 1134; sandy woods, Pancake bay, July 12, Nos. 1135, 1136.

**Poa nemoralis** L.

Thin soil, Coppermine pt., August 20, No. 1114.

**Poa palustris** L.—*P. triflora* Gilib. See Rhod. 18: 235 (1916).

Sandy woods, Sawpit bay, August 21, No. 1124; thin, rocky soil, east ridge, Havilland bay, August 12, No. 1125; sandy soil, Coppermine pt., August 20, No. 1126; roadside, Coppermine pt., August 2, No. 1127; roadside, Mamainse pt., July 13, No. 1128; sandy woods, Pancake bay, July 12, No. 1130.

**Poa glauca** Vahl.

Rock ledges, old mine, Carp lake, August 1, No. 1115; thin soil, Coppermine pt., August 20, No. 1116; open rocks, east ridge, Havilland bay, August 12, No. 1117; lava talus, Mamainse harbour, September 2, No. 1118; thin soil in open, east ridge, Havilland bay, August 12, No. 1119; hill-side, Carp lake, August 2, No. 1120; lava crevices, Mamainse pt., September 2, No. 1121; rock ledges, steep rock face, Batchawana falls, August 29, No. 1122; rock pockets, Mamainse pt., July 13, No. 1123.

**Dactylis glomerata** L.

Maple cut-over, Sault Ste. Marie, September 9, No. 1008.

**Phragmites communis** Trin., var. **Berlandieri** (Fournier) Fern.—*Phragmites communis* Am. auth. See Rhod. 34: 211 (1932).

Bog, Carp lake, July 25, No. 1112; in large colonies, in 2 feet of water, Batchawana is., September 10, No. 1113.

**Schizachne purpurascens** (Torr.) Swallen.—*Melica striata* of authors. See Jour. Wash. Acad. Sci. 18: 204 (1928).

Hardwoods, Batchawana is., September 13, No. 1145; hardwoods and hemlock association, Harmony river, August 13, No. 1146; rock crevices, elevation 1,900 feet, Mamainse mt., August 15, No. 1147; hardwoods, Mamainse mt., July 18, No. 1148.

**Agropyron trachycaulum** (Link) Steud., var. **novae-angliae** (Scribn.) Fern.—*A. tenerum* Vasey, var. *Novae-angliae* (Scribn.) Farwell. See Rhod. 35: 174 (1933).

Sandy soil, Pancake bay, August 10, No. 919; open, rocky crevice, east ridge, Havilland bay, August 12, No. 920; damp sand, Pancake river, August 10, No. 921; damp clay bank, Batchawana falls, August 27, No. 922; damp clay bank, Batchawana falls, August 27, No. 923; crevices of lava, Mamainse pt., September 2, No. 924; Carp lake, September 5, No. 925; open-grown poplar, Corbeil pt., July 31, No. 926; sandy shore, Batchawana is., September 12, No. 927; sandy soil, Pancake bay, July 22, No. 928; open-grown poplar,

Corbeil pt., July 31, No. 929; thin soil on rocks, east ridge, Havilland bay, August 17, No. 930; thin soil on rocks, east ridge, Havilland bay, August 12, No. 931; ridge above Carp lake, August 2, No. 932; thin soil on rocks, Carp lake, August 2, No. 933; sandy beach, Pancake bay, July 12, No. 934.

**Agropyron trachycaulum** (Link) Steud., var. **glaucum** (Pease and Moore) Malte.—*A. caninum*, f. *glaucum* Pease and Moore. See Rhod. 35: 177 (1933).

Damp sand beach, Havilland bay, August 13, No. 938; grassy place, Batchawana falls, August 27, No. 936; thin soil in open, east ridge, Havilland bay, August 12, No. 937.

**Agropyron repens** (L.) Beauv. See Rhod. 35: 183 (1933).

Gravelly soil, Batchawana village, August 14, No. 915; roadside, Coppermine pt., September 2, No. 917; sandy soil, Pancake bay, July 22, No. 918; roadside, Harmony river, August 13, No. 935.

**Elymus arenarius** L., var. **villosus** E. Mey.—*E. mollis* Trin. See Rhod. 17: 98 (1915).

Rocky lake shore, Pancake bay, July 16, No. 1028.

**Elymus virginicus** L.

Sand beach, Batchawana is., September 10, No. 1036; damp sand bank, Batchawana river, July 31, No. 1037; Batchawana falls, August 29, No. 1038; roadside, Harmony river, August 13, No. 1040; damp, wooded bank, Batchawana falls, No. 1041.

**Elymus virginicus**, forma **hirsutiglumis** (Scribn.) Fern. See Rhod. 35: 198 (1933).

Sand beach, Carp river, August 5, No. 1039.

**Elymus canadensis** L.

Sandy shores, Batchawana is., September 12, No. 1029; sandy river bank, Pancake river, September 4, No. 1030; sand beach, Harmony bay, September 16, No. 1031; sandy river bank, Batchawana falls, August 28, No. 1032; wet, sandy beach, Carp river, July 29, No. 1033; roadside, Pancake road, September 6, No. 1034; sandy beach, Havilland bay, August 13, No. 1035.

**Trisetum melicoideum** (Michx.) Vasey, var. **major** (Gray) Hitchc.

Batchawana falls, August 27, No. 1156.

**Trisetum spicatum** (L.) Richt., var. **molle** (Michx.) Piper.

On rocks, Mamainse pt., September 2, No. 1149; sandstone crevices, Corbeil pt., August 14, No. 1150; Batchawana falls, August 27, No. 1151; damp crevices in lava, Mamainse pt., July 13, Nos. 1152, 1153; thin soil on rock, Pancake bay, August 1, No. 1154; granite crevices, Batchawana falls, August 28, No. 1155.

**Deschampsia flexuosa** (L.) Trin.

Summit, elevation 1,900 feet, Mamainse mt., July 18, No. 1022; dry gravel, Pancake bay, August 10, No. 1023; sandy beach near woods, Pancake bay, July 12, No. 1024; shore, Batchawana is., September 12, No. 1025.

**Deschampsia caespitosa** (L.) Beauv., var. **glauca** (Hartm.) Lindm. fil. See Rhod. 28: 154 (1926).

Between beach boulders, Corbeil pt., August 14, No. 1021.

***Avena fatua* L.**

Roadside, Mamainse harbour, September 2, No. 970.

***Avena sativa* L.**

Camp clearing, Pancake bay, July 12, No. 971.

***Danthonia spicata* (L.) Beauv.**

Gravelly soil, Batchawana village, August 14, No. 1009; dry lava crevices, Mamainse pt., July 13, Nos. 1010, 1011; sandy woods, Sawpit bay, August 21, No. 1012; dry, gravelly soil, Batchawana village, August 14, No. 1013; thin soil in open, east ridge, Havilland bay, August 12, No. 1014; woods, Batchawana is., September 13, Nos. 1015, 1016.

***Calamagrostis canadensis* (Michx.) Beauv., var. *typica*. See Rhod. 32: 40 (1930).**

Open-grown poplar, Corbeil pt., July 31, No. 989; beaver meadow, Carp lake, July 25, No. 900; alnus-rubus-carex-aspidium association, Corbeil pt., July 26, No. 991; alder swamp, Corbeil pt., July 26, No. 992; Mamainse pt., July 23, No. 994; swampy ground, Carp river, July 29, No. 995; Batchawana is., July 9, No. 988.

***Ammophila breviligulata* Fern.—*A. arenaria* Am. auth., not *Arundo arenaria* L. See Rhod. 22: 71 (1920).**

Shores, Batchawana is., September 12, No. 967; sand beach, Harmony river, September 16, No. 968; beach, Pancake bay, August 10, No. 969.

***Agrostis stolonifera* L.—*A. alba* Am. auth., not L. See Rhod. 35: 317 (1933).**

Roadside, Coppermine pt., August 20, No. 953; wet, sandy shore, Island lake, August 22, No. 954; sand beach, Havilland bay, August 13, No. 955; shores, Batchawana is., September 12, No. 956; shores, Pancake bay, August 10, No. 957; damp sand, Pancake bay, August 10, No. 958; Batchawana village, August 14, Nos. 959, 960; damp sand, Pancake bay, August 10, No. 961; shores, Pancake bay, July 16, No. 962; Batchawana is., September 9, No. 963; cedar swamp, Pancake bay, August 22, No. 964; moist hollow, Mamainse mt., August 15, No. 965.

***Agrostis stolonifera* L., var. *compacta* Hartm.**

Low places, Batchawana village, August 14, No. 966.

***Agrostis scabra* Willd.—*A. hyemalis* recent Am. auth., not *Cornucopiae hyemalis* Walt. See Rhod. 35: 207 (1933).**

Damp ground, Mamainse pt., September 22, No. 939; sandy woods, Pancake bay, July 22, No. 940; sandy woods, Pancake bay, July 22, No. 941; dry, rocky soil, Mamainse pt., July 24, No. 943; damp soil, Mamainse pt., August 2, No. 944; open-grown poplar, Corbeil pt., July 31, No. 945; beaver meadow, Pancake bay, August 1, No. 946; grassy places, Batchawana falls, August 27, No. 947; open poplar association, Corbeil pt., August 5, No. 949; sandy soil, Batchawana falls, August 27, No. 950.

***Cinna latifolia* (Trev.) Griseb.**

Damp bank, Batchawana falls, August 27, No. 996; damp woods, east ridge, Havilland bay, August 12, No. 997; damp ground, Batchawana falls, August 27, No. 998; Batchawana river, August 27, No. 999; hardwoods, Batchawana is., September 15, No. 1001; wet ground, Mamainse road,



July 22, No. 1002; maple woods, Batchawana falls, August 27, No. 1003; moist depression, Mamainse mt., August 15, No. 1004; hardwoods, Harmony river, August 13, No. 1005; alders, Corbeil pt., August 8, No. 1007; clearing, Batchawana is., September 11, No. 1006.

**Alopecurus aequalis** Sobol.—*A. geniculatus*, var. *aristulatus* (Michx.) Torr. See Rhod. 27: 196 (1925).

Sandy woods, Pancake bay, July 12, No. 967; beaver meadow, Batchawana falls, August 27, No. 969.

**Phleum pratense** L.

Sandy clearing, Pancake camp, Pancake river, July 12, No. 1110; sand beach, Pancake bay, July 16, No. 1111.

**Phleum alpinum** L.

Damp sand by lagoon, Pancake river, August 10, No. 1109.

**Muhlenbergia uniflora** (Muhl.) Fern.—*Sporobolus uniflorus* (Muhl.) Scribn. and Merrill. See Rhod. 29: 10 (1927).

Sphagnum, Island lake, August 22, No. 1093; spruce-sphagnum, Xyris swamp, Pancake pt., August 21, No. 1094.

**Muhlenbergia racemosa** (Michx.) B.S.P.

Batchawana river, August 30, No. 1087; Xyris swamp, Pancake pt., August 2, No. 1088; Xyris swamp, Pancake pt., August 16, No. 1089; crevices of rock, Batchawana falls, August 28, No. 1091; lava crevices, Mamainse pt., September 2, No. 1090; swampy ground, Xyris swamp, Pancake pt., August 16, No. 1092.

**Muhlenbergia foliosa** Trin.

Sand between boulders, Batchawana falls, August 28, No. 1085; sand between boulders, Harmony River falls, July 3, No. 1086.

**Brachyelytrum erectum** (Schreb.) Beauv.

Wet woods, Batchawana falls, August 27, No. 972; open poplar association, Corbeil pt., August 5, No. 973; field, Corbeil pt., August 23, No. 974; river side, Carp lake, September 6, No. 975; damp soil, Mamainse mt., July 23, No. 976; maple woods, Mamainse mt., July 23, No. 977; open-grown poplar, Corbeil pt., July 31, No. 978.

**Milium effusum** L.

Hardwoods and hemlock association, Harmony river, August 13, No. 1083; Batchawana village, August 14, No. 1084.

**Oryzopsis pungens** (Torr.) Hitchc.

Thin soil, east ridge Havilland bay, August 12, No. 1097; sandy beach 1 mile west of Pancake river, edge of coniferous woods, Pancake pt., August 1, No. 1098; lava crevices, Mamainse pt., September 2, No. 1099.

**Oryzopsis asperifolia** Michx.

Sandy road, Pancake pt., August 1, No. 1095; maple woods, Batchawana falls, August 27, No. 1096.

**Hierochloë odorata** (L.) Beauv.

Sandy soil, Batchawana village, August 14, No. 1081.

**Phalaris arundinacea** L.

Shallow water between boulders, Corbeil pt., August 14, No. 1104; wet places, Pancake pt., August 1, No. 1109; thin soil, Pancake bay, August 1, No. 1105; wet places, Carp river, July 29, No. 1106; abundant, damp places, river mouth, Carp river, July 29, No. 1107; wet places, beaver meadow, Pancake pt., August 1, No. 1108.

**Leersia oryzoides** (L.) Swartz.

Shallow water, Havilland bay, August 13, No. 1082.

**Panicum lanuginosum** Ell., var. **implicatum** (Scribn.) Fern.—*P. implicatum* Scribn., *P. Lindheimeri*, var. *implicatum* (Scribn.) Fern. See Rhod. 36: 77 (1934).

Thin, rocky soil, Mamainse mt., July 18, No. 1100; dry soil, Carp lake, July 23, No. 1101; sandy woods, Pancake bay, July 22, No. 1102; sandy soil, Sawpit bay, August 21, No. 1103.

**Echinochloa crusgalli** (L.) Beauv.

Roadside, Pancake road, September 6, No. 1026; roadside, Pancake road, August 22, No. 1027.

**Setaria viridis** (L.) Beauv.

Roadside, Pancake road, August 22, No. 1144.

## CYPERACEAE

**Dulichium arundinaceum** (L.) Britton.

Low places, Batchawana is., September 10, No. 397; in beaver meadow, Batchawana falls, August 27, No. 398; muddy places in sphagnum bog west of beaver meadow, Pancake pt., July 23, No. 399; in 4 inches of water in decayed humus, Carp lake, July 25, No. 400; in 18 inches of water in a quiet bay, Batchawana is., September 11, No. 401.

**Eriophorum tenellum** Nutt.

Swamp, Batchawana is., September 10, No. 2520; swampy ground, Pancake bay, August 5, No. 2521; swamp, Island lake, August 22, No. 2522; swampy ground, Xyris swamp, Pancake pt., August 16, No. 2523; open sphagnum bog, beaver meadow, Pancake bay, July 23, No. 2524.

**Eriophorum angustifolium** Roth.

In open sphagnum, Xyris swamp, Pancake pt., August 16, No. 2525.

**Eriophorum viridi-carinatum** (Engelm.) Fern.

Open sphagnum bog west of beaver meadow, Pancake pt., July 23, Nos. 2526, 2527.

**Eriophorum virginicum** L.

Open sphagnum bog, beaver meadow, Pancake bay, July 23, No. 2528; sphagnum bog, Dumbell lake, Pancake pt., July 15, No. 2529; black spruce-sphagnum bog, Corbeil pt., July 22, No. 2530; swampy ground, Xyris swamp, Pancake pt., August 5, No. 2531; black spruce-sphagnum stand, Corbeil pt., August 9, No. 2532; cedar swamp, Pancake pt., August 22, No. 2533; spruce-tamarack stand, Corbeil pt., August 8, No. 2534; Xyris swamp, Pancake pt., August 16, No. 2535; swampy ground, Sawpit bay, August 21, No. 2537.

**Eriophorum virginicum** L., var. **albidum** Gray.

Swamp, Island lake, August 22, No. 2536.

**Scirpus caespitosus** L., var. **callosus** Bigelow. See Rhod. 23: 22 (1921).

Wet soil at margin of rain pools in lava rocks, Mamainse pt., July 13, Nos. 364, 363.

**Scirpus hudsonianus** (Michx.) Fern.

Damp soil by spring, Mamainse pt., July 13, No. 362; crevices of rocks on shore, 2 miles from mouth of Pancake river, Corbeil pt., July 29, No. 361; open sphagnum, west of beaver meadow, Pancake pt., July 23, No. 360; in wet sand by rock pools, Batchawana falls, August 28, No. 359.

**Scirpus subterminalis** Torr.

Shallow peaty pools, Xyris swamp, Pancake pt., August 5, No. 356; swampy ground, Xyris swamp, Pancake pt., August 16, No. 355.

**Scirpus americanus** Pers.

Forming large colonies in 2 feet of water, Batchawana is., September 10, No. 380; damp clay by roadside, Havilland bay, August 12, No. 379; shallow water, Sawmill bay, September 18, No. 378.

**Scirpus Torreyi** Olney.

In 18 inches of water, Batchawana is., September 11, No. 354; edge of pond, Sand pt., September 12, No. 353.

**Scirpus validus** Vahl.

Beaver meadow, Batchawana falls, August 27, No. 352; shallow water near mouth of Batchawana river, July 31, Nos. 349, 351; shallow water, Sawmill bay, September 18, No. 350.

**Scirpus acutus** Muhl.—*S. occidentalis* (Wats.) Chase. See Rhod. 22: 55 (1920).

Sheltered bays in 2 feet of water, Batchawana is., September 13, No. 386; in 3 feet of water in sand, Batchawana is., September 13, No. 385; shallow water, Havilland bay, August 13, No. 384; in mud in shallow water, Carp lake, July 24, No. 383; shallow water near mouth of Batchawana river, July 31, No. 382; shallow water in mud, Island lake, August 22, No. 381.

**Scirpus rubrotinctus** Fern.

Shallow water in clay near mouth of Carp river, July 29, No. 358; shallow water at edge of lagoon, Pancake river, August 10, No. 357.

**Scirpus atrovirens** Muhl., var. **georgianus** (Harper) Fern.—*S. georgianus* Harper. See Rhod. 23: 134 (1921).

Damp, loamy soil, Mamainse tote road, Corbeil pt., August 2, No. 367; damp ground, Batchawana falls, August 27, No. 366; damp loam, old Agawa trail, Carp lake, July 24, No. 365.

**Scirpus cyperinus** (L.) Kunth., var. **condensatus** Fern.

Roadside ditch, Havilland bay, July 13, No. 368.

**Scirpus cyperinus** (L.) Kunth., var. **pelius** Fern.

Ditch by roadside, Havilland bay, July 13, No. 369.

**Scirpus pedicellatus** Fern.

Shallow water, Havilland bay, August 13, No. 371; alder swamp, Batchawana is., September 11, No. 370.

**Scirpus pedicellatus** Fern., var. **pullus** Fern.

Low places in open-grown poplar, Corbeil pt., August 5, No. 372.

**Scirpus atrocinctus** Fern.

Gravelly shore of small island, Smith lake, July 18, No. 375; low places near mouth of Pancake river, July 13, No. 374; damp clay beside old Agawa trail, Carp lake, July 23, No. 373; roadside ditch, Carp river, July 31, No. 377.

**Scirpus atrocinctus** Fern., var. **brachypoda** Fern.

Low, damp ground in the open, Dumbell lake, Pancake pt., July 15, No. 376.

**Eleocharis Robbinsii** Oakes

Shallow water in very soft mud, Island lake, August 22, No. 323.

**Eleocharis acicularis** R. and S.

Shallow water in mud at mouth of Batchawana river, July 31, No. 289 (submerged form); wet, peaty soil, Pancake pt., August 1, No. 345; damp soil in beaver meadow, Pancake pt., July 17, No. 346; soggy ground at water's edge, Dumbell lake, Pancake pt., July 15, No. 348; damp ground in beaver meadow, Batchawana falls, August 29, No. 347.

**Eleocharis ovata** (Roth) R. and S.

Damp sand in beaver meadow, Pancake pt., July 23, No. 2414; muddy ground in beaver meadow, Batchawana falls, August 27, No. 333.

**Eleocharis obtusa** (Willd.) Schultes.

Sand-bar just above the highway bridge, Pancake river, September 4, No. 337; Pancake tote road, Corbeil pt., September 6, No. 335; beaver meadow, Pancake pt., July 17, No. 336; wet sand, Harmony river, September 3, No. 334.

**Eleocharis palustris** (L.) R. and S., var. **major** Sonder.—*E. palustris* most Am. auth. See Rhod. 31: 61 (1929).

Wet sand at mouth of Batchawana river, July 31, No. 332; damp sand on beach, Pancake bay, July 16, No. 331; forming large colonies, Batchawana is., September 10, Nos. 329, 330; in 2 feet of water, Dumbell lake, Pancake pt., July 15, No. 328; damp sand at mouth of Batchawana river, July 31, No. 327; shallow water, Havilland bay, August 13, No. 326; in 2 feet of water over muck, Carp lake, July 25, No. 325; in 2 feet of water, Batchawana is., September 10, No. 324; in sand in 1 foot of water, Batchawana is., September 10, No. 322.

**Eleocharis capitata** (L.) R. Br., var. **borealis** Svenson.

In damp sand at edge of lagoon, Pancake bay, July 16, Nos. 343, 344; wet places in beaver meadow, Pancake pt., July 23, No. 342.

**Eleocharis compressa** Sull.—*E. acuminata* (Muhl.) Nees. See Rhod. 34: 215 (1932).

Wet sand at mouth of Batchawana river, July 31, No. 338; in damp sand at edge of lagoon, Pancake bay, July 16, Nos. 340, 341; wet sedge turf, Corbeil pt., August 1, No. 339.

**Cladium mariscoides** (Muhl.) Torr.

Swampy ground, Xyris swamp, Pancake pt., August 16, No. 402; in pure stand forming compact turf, Batchawana is., September 10, No. 403.

**Rynchospora fusca** (L.) Ait. f.

Swampy shore, Island lake, August 22, No. 391; swampy ground, Xyris swamp, Pancake pt., August 16, No. 392; wet sand, Havilland bay, August 13, No. 393; wet, peaty soil, Pancake pt., August 1, No. 394; shallow, muddy pools in Xyris swamp, Pancake pt., August 5, No. 395; wet places in open sphagnum bog, Pancake pt., July 23, No. 396.

**Rynchospora alba** (L.) Vahl.

Abundant in wet, peaty soil, Xyris swamp, Pancake pt., August 5, No. 387; open sphagnum west of beaver meadow, Pancake pt., July 23, No. 388; swampy ground in Xyris swamp, Pancake pt., August 16, No. 389; swampy ground, Batchawana is., September 10, No. 390.

**Carex scoparia** Schkuhr.

Low places, Batchawana village, August 14, No. 611; low, gravelly soil at mouth of Harmony creek, September 16, No. 610; damp sand, Sawpit bay, August 21, No. 612.

**Carex projecta** Mackenzie.—*C. tribuloides* Wahlenb. var. *reducta* Bailey. See Bull. Torr. Bot. Club 35: 264 (1908).

Black ash swamp, Sault Ste. Marie, July 10, No. 616; Batchawana falls, August 27, No. 515; alnus association north of highway, Corbeil pt., July 23, No. 416; Batchawana is., September 9, No. 415; low places in beaver meadow, Pancake pt., August 1, No. 414; low places on ridge, Carp lake, August 2, No. 413; low places, Batchawana village, August 14, No. 412; roadside ditch, Pancake bay, July 31, Nos. 411, 410; roadside ditch, Corbeil pt., July 31, Nos. 409, 408; edge of hardwood bush, Batchawana is., September 13, No. 407; loamy soil, Mamainse tote road, Corbeil pt., August 2, No. 406; sand beach, Pancake bay, July 16, No. 404.

**Carex Crawfordii** Fern.

Spruce-sphagnum bog, Batchawana is., September 11, No. 417; damp sand, Sawpit bay, August 21, No. 472; damp ground, old Agawa trail, July 22, No. 418; damp ground, old Agawa trail, Carp lake, July 22, No. 418a; in damp places in beaver meadow, Pancake pt., July 23, No. 419; sand, Pancake bay, July 23, No. 420; roadside ditch, Corbeil pt., July 31, Nos. 421, 422.

**Carex Crawfordii** Fern., var. *vogens* Fern.

Wet ground, old Agawa trail, Carp lake, July 22, No. 423; damp ground along trail, Smith lake, July 23, No. 424; moist ground, Gimlet



Creek trail, Pancake bay, July 30, No. 425; damp ground in beaver meadow, Pancake pt., August 1, Nos. 426, 427; roadside ditch, Pancake pt., August 1, Nos. 428, 429.

**Carex foenea** Willd.

Gravelly soil, Batchawana village, August 14, No. 431.

**Carex leporina** L.

Roadside, Sawpit bay, August 21, No. 619; roadside ditch, Pancake bay, August 1, No. 618.

**Carex aenea** Fern.

Low places in sandy woods, Pancake bay, July 12, No. 430.

**Carex adusta** Boott.

Rock crevices in east ridge, Haviland bay, August 13, No. 621; roadside ditch in sand, Pancake bay, August 1, No. 620.

**Carex gynocrates** Wormsk.

Mossy hummocks in Xyris swamp, Pancake pt., August 5, Nos. 423, 433.

**Carex exilis** Dewey.

Swampy ground, Xyris swamp, Pancake pt., August 5, No. 434.

**Carex angustior** Mackenzie.—*C. stellulata*, var. *angustata* Carey.

Along old Mamainse tote road, Corbeil pt., July 22, No. 439; damp ground in beaver meadow, Pancake pt., July 23, No. 440; wet sand at water's edge, Pancake bay, July 16, No. 441; low ground in beaver meadow, Pancake pt., July 17, No. 443; low ground near Pancake camp, Pancake river, July 13, No. 442.

**Carex laricina** Mackenzie.

Alder swamp, Corbeil pt., July 26, No. 438.

**Carex sterilis** Willd.

Sand beach, Pancake bay, July 16, No. 437; black spruce-sphagnum bog, Corbeil pt., July 22, No. 471.

**Carex interior** Bailey.—*C. scirpoides* Schkuhr. in part.

Swamp, Carp lake, July 25, No. 435; roadside through alder swamp, Corbeil pt., July 15, No. 436.

**Carex canescens** L., var. *subloliacea* Laested.

Wet sand in beaver meadow, Pancake pt., July 23, Nos. 461, 462; edge of pools in cedar swamp, Gimlet Creek trail, Pancake bay, July 12, No. 470.

**Carex canescens** L., var. *disjuncta* Fern.

Sphagnum bog, Dumbell lake, Pancake pt., July 15, No. 469.

**Carex brunnescens** Poir., var. *sphaerostachya* (Tuckerm.) Küken. See Rhod. 28: 163 (1926).

In hardwood bush, Batchawana is., September 13, No. 622; alder swamp, Corbeil pt., August 8, No. 467; old Agawa trail, Carp lake, August 6, No. 517; beaver meadow, Carp lake, July 25, No. 466; old Agawa trail,

Carp lake, July 18, No. 465; Batchawana is., September 9, No. 464; damp ground on Mamainse tote road, Corbeil pt., July 22, No. 463; wet places in beaver meadow, Pancake pt., August 1, Nos. 459, 460; roadside ditch, Corbeil pt., July 31, No. 458.

**Carex Deweyana** Schwein.

Poplar-birch slope, Pancake bay, July 27, No. 457; in open hardwood bush near highway, Harmony river, August 13, No. 456; Batchawana village, August 14, No. 455; rocky shore east of Pancake camp, Corbeil pt., July 29, No. 454; in mixed hardwoods on ridge, Carp lake, August 2, No. 453; open poplar woods on east ridge, Havilland bay, August 12, No. 452.

**Carex trisperma** Dewey.

Sphagnum bog, Dumbell lake, Pancake pt., July 15, No. 451; wet woods, Gimlet Creek trail, Pancake bay, July 30, No. 450; sphagnum bog, Batchawana is., September 11, No. 449; cedar swamp, Gimlet Creek trail, Pancake bay, July 12, No. 448; spruce-cedar swamp, Corbeil pt., August 7, No. 447.

**Carex tenella** Schkuhr.

Damp soil, Sawpit bay, August 21, No. 516; wet ground along Gimlet Creek trail, Pancake bay, July 30, No. 446; alder swamp, Batchawana is., September 9, No. 445; alder swamp, Corbeil pt., July 26, No. 444.

**Carex vulpinoidea** Michx.

Beaver meadow, Batchawana falls, August 29, No. 614; gravelly soil, Batchawana village, August 14, No. 514.

**Carex stipata** Muhl.

Wagon road, Batchawana is., September 11, No. 617; loamy soil, Mamainse tote road, Corbeil pt., August 2, No. 405; low ground, Pancake bay, July 13, No. 513; black ash swamp, Sault Ste. Marie, July 10, No. 512; damp ground on old Agawa trail, Carp lake, July 23, No. 511; beaver meadow, Batchawana falls, August 29, No. 510.

**Carex crinita** Lam., var. **gynandra** (Schwein.) Schwein. and Torr.

Low places in woods, Pancake bay, July 13, No. 509; wet ground along old Agawa trail, Carp lake, July 22, No. 508; low places behind the beach, Pancake bay, July 16, No. 507; river bank near mouth, Pancake river, August 10, No. 506; alder swamp, Batchawana is., September 9, No. 505.

**Carex stricta** Lam.

Old Agawa trail, Carp lake, July 18, No. 503; in water between rocks, Corbeil pt., August 1, No. 501; shallow water, Dumbell lake, Pancake pt., July 15, No. 500; rocky shore, Corbeil pt., July 16, No. 499; damp soil, Smith lake, July 23, No. 498.

**Carex stricta** Lam., var. **angustata** (Boott) Bailey.

Black spruce-sphagnum bog, Corbeil pt., July 22, No. 504; between stones on gravel beach, Corbeil pt., July 29, No. 502.

**Carex aurea** Nutt.

Old clearing, Batchawana is., September 11, No. 496; low places in clearing, Batchawana is., September 13, No. 495.

**Carex pauciflora** Lightf.

Swampy ground, Xyris swamp, Pancake pt., August 16, No. 545; abundant in sphagnum bog, Dumbell lake, Pancake pt., July 15, No. 494.

**Carex leptalea** Wahlenb.

Damp ground in beaver meadow, Pancake pt., July 23, No. 432; rocky shore, Corbeil pt., July 29, No. 493; sphagnum hummocks, Xyris swamp, Pancake pt., August 5, No. 492; alder swamp, Corbeil pt., August 8, No. 491; swampy woods, Havilland bay, August 13, No. 490; swampy ground, Corbeil pt., July 16, No. 489; edge of pools, cedar swamp, Gimlet Creek trail, Pancake bay, July 12, No. 488.

**Carex polygama** Schkuhr.

Low ground, Sawpit bay, August 21, No. 546; rocky shore, Corbeil pt., July 29, No. 487; low sand beach, Pancake bay, August 10, No. 486.

**Carex communis** Bailey.

Carp river, September 5, No. 518; hardwoods near highway, Harmony river, August 13, No. 519.

**Carex pennsylvanica** Lam.

Sandy beach, Pancake bay, August 1, No. 613.

**Carex livida** (Wahlenb.) Willd., var. **Grayana** (Dewey) Fern.—*C. livida* most auths. See Rhod. 28: 8 (1926).

Sphagnum bog, Xyris swamp, Pancake pt., August 16, No. 485.

**Carex paupercula** Michx., var. **pallens** Fern.

Cedar swamp, Dumbell lake, Pancake pt., July 15, No. 483; sphagnum bog, Corbeil pt., July 22, No. 482; alder swamp, Batchawana is., September 9, No. 480.

**Carex limosa** L.

Swampy ground, Xyris swamp, Pancake pt., August 5, No. 479; Xyris swamp, Pancake pt., August 16, No. 478.

**Carex eburnea** Boott.

Ledges on rock face near upper falls, Batchawana river, August 29, No. 477; lava faces and ledges, Mamainse pt., September 2, No. 476; wet lava crevices, Mamainse pt., July 13, No. 475; damp sand by rock pool, Mamainse pt., September 2, No. 474.

**Carex blanda** Dewey.—*C. laxiflora* Lam., vars. *blanda* (Dewey) Boott and *varians* Bailey. See Rhod. 24: 194 (1922).

Low, sandy woods, Pancake bay, July 12, No. 526; maple woods about 3 miles north of highway, Harmony river, September 3, No. 525.

**Carex leptonervia** Fern.—*C. laxiflora* Lam., var. *leptonervia* Fern. See Rhod. 16: 214 (1914).

Roadside ditch, Corbeil pt., July 31, No. 524; damp soil in deciduous woods, Smith lake, July 23, No. 615; roadside ditch, Pancake bay, August 1, No. 520; wet, sandy soil, Palmer tp., July 15, No. 521; wet clay soil along Gimlet Creek trail, Pancake bay, July 29, No. 522; damp ground, Mamainse pt., July 13, No. 523; gravelly field, Batchawana village, August 14, No. 623.

**Carex flava** L.

Wet sand, Smith lake, July 23, No. 527; swampy woods, Xyris swamp, Pancake pt., August 16, No. 528; wet sand near creek, Sawpit bay, August 19, No. 529.

**Carex cryptolepis** Mackenzie.—*C. flava* L., vars. *rectirostra* Gaudin and *elatio*r Schlecht. in part. See Torreya 14: 155 (1914).

Beaver meadow, Pancake pt., August 1, No. 530; damp ground in beaver meadow, Pancake pt., July 23, No. 531; low ground, Sawpit bay, August 21, No. 532; low ground, Sawpit bay, August 21, No. 533; wet sand along creek, Sawpit bay, August 19, No. 534; damp sand in beaver meadow, Pancake pt., July 23, No. 535; mucky shore, Carp lake, July 25, No. 536; beaver meadow, Batchawana falls, August 29, No. 537; low ground, Sawpit bay, August 21, No. 538.

**Carex Oederi** Retz. var. **pumila** (Cosson and Germain) Fern.

Rocky shore, Corbeil pt., July 16, No. 539; rocky beach, Corbeil pt., July 29, No. 540; roadside ditch, Corbeil pt., July 31, No. 541; gravelly beach, Batchawana is., September 10, No. 542; shallow water in sandy lagoon, Pancake river, August 10, No. 543; wet sand beach, Pancake bay, July 16, No. 544.

**Carex castanea** Wahlenb.

Damp ground along old Agawa trail, Carp lake, July 23, No. 547.

**Carex capillaris** L., var. **elongata** Olney.

Damp soil in crevices of lava, Mamainse pt., July 13, No. 548; rocky slopes, Mamainse pt., September 2, No. 549.

**Carex arctata** Boott.

Batchawana is., September 9, No. 550; in hardwood bush, Batchawana is., September 11, No. 551; in mixed deciduous woods on ridge, Carp lake, August 2, No. 552; hardwood bush near highway, Harmony river, August 13, No. 553; Batchawana village, August 14, No. 554; wooded slope, Corbeil pt., July 28, No. 555; Batchawana falls, August 27, No. 556; damp places in woods, Fawn hill, Pancake bay, July 31, No. 557; roadside ditch, Pancake bay, August 1, No. 558; wet grounds on rocky point, Smith lake, July 23, No. 559.

**Carex debilis** Michx., var. **Rudgei** Bailey.

Crevices of lava, Mamainse mt., August 15, No. 560.

**Carex scabrata** Schwein.

Poplar-birch slope, Corbeil pt., July 28, No. 561; creek valley, Batchawana falls, August 28, No. 562; moist sand near creek, Coppermine pt., September 2, No. 563; low places on top of hill, elevation 1,900 feet, Mamainse mt., August 15, No. 564; swampy ground, Xyris swamp, Pancake pt., August 5, No. 565; swampy woods near old mine, Carp lake, August 2, No. 566; low places in coniferous woods, Batchawana is., September 9, No. 567; river bank near mouth, Carp river, July 29, No. 568; damp loam beside old Agawa trail, Carp lake, July 24, No. 569; damp soil by stream, Smith lake, July 23, No. 570.

**Carex lasiocarpa** Ehrh.—*C. filiformis* Good. and Am. auth., not L. See Küken. in Das Pflanzenreich heft 38: 747 (1909).

Peaty soil, Pancake pt., August 1, No. 571; swamp, Batchawana is., September 10, No. 572; in 18 inches of water, Dumbell lake, Pancake pt., July 15, No. 573; shallow water at river mouth, Carp river, July 29, No. 574.

**Carex oligosperma** Michx.

In 2 feet of water, Cross lake (near Carp lake), July 25, No. 575; sphagnum bog, Corbeil pt., August 9, No. 576; black spruce-sphagnum bog, Herrick tp., July 22, No. 577; in 18 inches of water, Dumbell lake, Pancake pt., July 15, No. 578; peaty soil, Pancake pt., August 1, No. 579.

**Carex hystricina** Muhl.

Roadside ditch, Corbeil pt., July 31, No. 580.

**Carex retrorsa** Schwein.

In sand on river bank, near mouth, Pancake river, July 27, No. 581; swamp, Batchawana is., September 10, No. 582; Pancake river, September 4, No. 583; wet places in beaver meadow, Pancake pt., August 1, No. 584; bog, Carp lake, July 25, No. 585.

**Carex intumescens** Rudge.

Roadside ditch, Pancake bay, July 31, No. 586; alder swamp, Batchawana is., September 9, No. 587; poplar-birch slope, Corbeil pt., July 28, No. 588; wet ground along old Agawa trail, Carp lake, July 22, No. 589; wet places in woods, Dumbell lake, Pancake pt., July 15, No. 590; black ash swamp, Sault Ste. Marie, July 10, No. 591; low places in woods, Pancake bay, July 13, No. 592; damp soil by stream, Smith lake, July 23, No. 593.

**Carex Michauxiana** Boeckl.

Low ground on summit, elevation 1,900 feet, Mamainse mt., July 18, No. 594; sphagnum bog west of beaver meadow, Pancake pt., July 23, No. 595; Batchawana is., September 10, No. 596; swampy ground Xyris swamp, Pancake pt., August 16, No. 597.

**Carex saxatilis** L., var. **rhomalea** Fern.

Among rocks on beach, Corbeil pt., July 20, No. 484.

**Carex vesicaria** L.

Beech woods, Batchawana is., September 11, No. 598; Batchawana is., September 9, No. 599; low ground along the old Agawa trail, Carp lake, July 23, No. 600; peaty soil, Pancake pt., August 1, No. 601.

**Carex rostrata** Stokes.

Sphagnum bog, Dumbell lake, Pancake pt., July 15, No. 602; in shallow water, Carp lake, July 24, No. 603; roadside ditch, Corbeil pt., July 31, No. 604.

**Carex rostrata** Stokes, var. **utriculata** (Boott) Bailey.

Forming tussocks in swampy ground, Sawpit bay, August 21, No. 605; swampy ground in woods, Pancake bay, July 12, No. 606; swamp,



Island lake, August 22, No. 607; in mud in shallow water near river mouth, Carp river, July 29, No. 608; low places forming tussocks, Sawpit bay, August 21, No. 609.

## ARACEAE

**Symplocarpus foetidus** (L.) Nutt.

Cedar bog, Pancake river, August 21, No. 820 (lv.).

**Arisaema triphyllum** (L.) Schott.

Alder swamp, Batchawana is., September 9, No. 817 (fr.); mixed deciduous woods on slope, Carp lake, July 25, No. 818 (lv.); mixed deciduous woods, Mamainse mt., July 23, No. 819 (lv.); humus on rooted talus, Mamainse mt., August 15, No. 821 (lv.); moist gully in hardwoods, Batchawana river, August 27, No. 822 (lv.); deciduous woods, Carp lake, September 5, No. 823 (fr.).

## XYRIDACEAE

**Xyris montana** Ries.

Open damp places, Xyris swamp, Pancake pt., August 16, No. 2428 (fl.); swampy ground, Xyris swamp, Pancake bay, August 5, No. 2429 (fl.); swampy shore, Island lake, August 22, No. 2430 (fl., fr.).

## ERIOCAULACEAE

**Eriocaulon septangulare** With.—*E. articulatum* (Huds.) Morong.

Shallow water, lagoon, Pancake river, August 15, No. 2423 (fl.); in 1 foot of water, in sand, Batchawana is., September 10, No. 1337 (fl.); wet, peaty soil, Hardpan swamp, Pancake bay, August 1, No. 1338 (fl.); in 2 feet of water, bog bottom, Carp lake, July 25, No. 1339 (fl.); Xyris swamp, Pancake pt., August 21, No. 1340 (fl.); floating bog, Dumbell lake, Pancake pt., July 15, No. 1341 (fl.); shallow water, Havilland bay, August 13, No. 1342 (fr.).

## PONTEDERIACEAE

**Pontederia cordata** L.

In muck near shore, Carp lake, September 5, No. 2368 (fl.).

## JUNCACEAE

**Juncus bufonius** L.

On Mamainse tote road, Corbeil pt., August 2, No. 626; damp soil in the open along old Agawa trail, Smith lake, August 2, No. 629.

**Juncus macer** S. F. Gray.—*J. tenuis* Willd.

Sandy soil by roadside, Island lake, August 22, No. 697; open, sandy woods, Pancake pt., September 5, No. 628; wet sand, Havilland bay, August 13, No. 650; low ground, Batchawana village, August 14, No. 632; damp soil along Mamainse tote road, Corbeil pt., August 2, No. 631; roadside ditch, Corbeil pt., August 4, No. 630; muddy bank near river mouth, Carp river, July 31, No. 633; damp soil on rocky point, Carp lake, July 23, No. 634.

**Juncus Dudleyi** Wieg.

Edge of sandy pool at mouth of Black creek, Batchawana bay, July 24, No. 635.

**Juncus Greenei** Oakes and Tuckerm.

Low places in sand, Sand pt., September 12, No. 694.

**Juncus balticus** Willd., var. **littoralis** Engelm.

Gravelly beach, Harmony bay, September 18, No. 637; damp sand at margin of lagoon, Pancake bay, August 10, No. 638; dry sand beach near mouth of Black creek, Batchawana bay, July 24, No. 639; damp sand, Havilland bay, August 13, No. 640; in shallow water at edge of lagoon, Pancake bay, July 16, No. 641; low places, sand beach, Sand pt., July 12, No. 642.

**Juncus filiformis** L.

Low places in beaver meadow, Pancake pt., August 1, No. 643; in pool on rocky shore, Corbeil pt., August 1, No. 644; damp sand in beaver meadow, Pancake pt., July 23, No. 645; wet ground, Dumbell lake, Pancake pt., July 15, No. 646.

**Juncus effusus** L., var. **solutus** Fern. and Wieg. See Rhod. 12: 81 (1910).

Wet places, Carp lake, July 23, No. 647; wet sand, Pancake bay, July 16, No. 649.

**Juncus effusus** L., var. **Pylaei** (LaHarpe) Fern. and Wieg. See Rhod. 12: 92 (1910).

Swamp, Batchawana is., September 9, No. 648.

**Juncus brachycephalus** (Engelm.) Buchenau.

Shallow water, Havilland bay, August 13, No. 685; in sand between boulders, Mamainse harbour, September 2, No. 677.

**Juncus brevicaudatus** (Engelm.) Fern.

Damp sand beach, Havilland bay, August 13, No. 696; muddy bank near river mouth, Carp river, July 29, No. 636; marshy ground at edge of pond, Sand pt., September 12, No. 695; in sand by rock pool, Batchawana falls, August 28, No. 690; wet ground in beaver meadow, Pancake pt., July 17, No. 689; shallow water, Havilland bay, August 13, No. 654; damp sand in beaver meadow, Pancake pt., July 23, No. 655; roadside ditch, Corbeil pt., July 31, No. 656; damp ground, Carp lake, July 23, No. 657; peaty pools, Xyris swamp, Pancake pt., August 16, No. 658; peaty soil, Hardpan swamp, Pancake pt., August 1, No. 659; peaty soil, Hardpan swamp, Pancake bay, August 1, No. 660; damp sand, Havilland bay, August 13, No. 661; low ground, Sawpit bay, August 21, No. 670; damp ground in beaver meadow, Pancake pt., July 17, No. 669; low ground, Sawpit bay, August 21, No. 662.

**Juncus canadensis** J. Gay.

Marshy ground at edge of pond, Sawpit bay, September 12, No. 663; swamp, Batchawana is., September 10, No. 664; peaty soil, Xyris swamp, Pancake pt., August 16, Nos. 665, 666; low ground, Sawpit bay, August 21, No. 667; shallow water, Havilland bay, August 13, No. 668; swamp, Island lake, August 22, No. 671; low ground, Sawpit bay, August 21, No. 672; Carex swamp, Batchawana is., September 10, No. 673; in sand at mouth of river, Harmony river, September 3, No. 674.

**Juncus pelocarpus** Mey.

Shallow, peaty pool, Xyris swamp, Pancake pt., August 16, No. 678; wet, peaty soil, Hardpan swamp, Pancake pt., August 1, No. 676; shallow water, Havilland bay, August 13, No. 675.

**Juncus nodosus** L.

Shallow water, Havilland bay, August 13, No. 680; muddy bank near river mouth, Carp river, July 29, No. 681; sand-bar, Batchawana falls, August 27, No. 2413; wet sand, Black creek, Batchawana bay, July 24, No. 682; wet sand in shallow water, Havilland bay, August 13, No. 683.

**Juncus acuminatus** Michx.

Swampy ground, Xyris swamp, Pancake pt., August 16, No. 687; shallow water, Havilland bay, August 13, No. 688.

**Juncus alpinus** Vill., var. *rariflorus* Hartm.—*J. alpinus*, var. *insignis* Fries.

In sand between boulders, Mamainse harbour, September 2, No. 679; wet sand beach, Batchawana bay, July 24, No. 686; shallow water in lagoon, Pancake bay, August 10, No. 691; shallow water, Havilland bay, August 13, No. 693.

**Juncus stygius** L., var. *americanus* Buchenau.

Swampy peat, Xyris swamp, Pancake pt., August 16, No. 653; mossy hummocks in sphagnum bog, Xyris swamp, Pancake pt., August 5, No. 652.

**Luzula saltuensis** Fern.

Open-grown poplar stand, Corbeil pt., July 29, No. 698.

## LILIACEAE

**Tofieldia glutinosa** (Michx.) Pers.

In low ground in carex turf, Mamainse harbour, September 2, No. 764 (fr.); low, sandy soil, by lake shore, Mamainse pt., July 13, No. 765 (fl.); swampy ground, Xyris swamp, Pancake pt., August 5, No. 766 (fr.).

**Allium Schoenoprasum** L., var. *sibiricum* (L.) Hartm.

In sand between boulders, Batchawana falls, August 28, No. 726 (late fl.); rocky shore, Batchawana falls, August 28, No. 727 (fr.).

**Lilium philadelphicum** L.

Open mixed woods, Mamainse pt., July 13, No. 730 (fl.); swampy ground, Xyris swamp, Pancake pt., August 16, No. 731 (fr.); mixed woods, Sawpit bay, August 21, No. 732 (fr.).

**Clintonia borealis** (Ait.) Raf.

Cedar swamp, Pancake pt., August 22, No. 728 (fr.); cedar swamp, Corbeil pt., August 22, No. 2454 (fr.); balsam-birch woods, Coppermine pt., September 2, No. 2474 (fr.); maple association, elevation 1,900 feet, Mamainse mt., July 23, No. 729 (fr.).

**Smilacina racemosa** (L.) Desf.

Maple woods, elevation 1,900 feet, Mamainse mt., July 23, No. 747 (fr.); wooded talus of Carp ridge, Carp lake, September 5, No. 748 (fr.).

**Smilacina stellata** (L.) Desf.

Sandy beach, Pancake bay, July 22, No. 749 (fr.); sand beach, Sand pt., September 12, No. 750 (fr.); sand beach, Batchawana is., September 13, No. 751 (fr.).

**Smilacina trifolia** (L.) Desf.

Black spruce-sphagnum bog, Corbeil pt., July 15, No. 752 (fr.); sphagnum bog north of Dumbell lake, Pancake pt., July 15, No. 753 (fr.).

**Maianthemum canadense** Desf.

Carp river, September 6, No. 733 (fr.); sphagnum-spruce bog, Batchawana is., September 11, No. 734 (fr.); sandy woods, Sand pt., September 12, No. 735 (fr.); mixed woods, Mamainse pt., July 13, No. 736 (fl.); mixed hardwoods, Pancake pt., August 21, No. 7455 (fr.); mixed hardwood bush at border of Dumbell lake, Pancake pt., July 15, No. 737 (fr.); maple woods, elevation 1,900 feet, Mamainse mt., July 23, No. 742 (fr.).

**Maianthemum canadense** Desf., var. **interius** Fern. See Rhod. 16: 211 (1914).

Mixed woods, Batchawana falls, August 28, No. 738 (fr.); sandy river bank, Batchawana falls, August 28, No. 739 (lv.); sandy woods at river mouth, Harmony river, September 3, No. 740 (lv.); sandy woods, Sand pt., September 12, No. 741 (fr.); sandy beach, Batchawana is., September 13, No. 743 (lv.).

**Streptopus amplexifolius** (L.) DC., var. **americanus** Schultes. See Rhod. 37: 98 (1935).

In woods near river mouth, Carp river, July 29, No. 763 (fr.); cedar swamp, by Gimlet Creek trail, Pancake bay, July 12, No. 762 (fr.); in woods, Batchawana falls, August 27, No. 761 (fr.); beside small creek, Mamainse pt., September 2, No. 760 (fr.).

**Streptopus roseus** Michx., var. **longpipes** (Fern.) Fassett. See Rhod. 37: 110 (1935).

River bank near falls, Carp river, September 7, No. 756 (lv.).

**Streptopus roseus** Michx., var. **perspectus** Fassett. See Rhod. 37: 110 (1935).

Sandy woods, Pancake bay, July 12, No. 759 (fr.); maple woods, elevation 1,900 feet, Mamainse mt., July 23, No. 758 (fr.); edge of small creek, Mamainse pt., September 2, No. 757 (lv.); cedar swamp, Gimlet Creek trail, Pancake bay, July 12, No. 755 (lv.); hardwood bush near Dumbell lake, Pancake pt., July 15, No. 754 (lv.).

**Polygonatum pubescens** (Willd.) Pursh.—*P. biflorum* (Walt.) Ell.

Batchawana falls, August 27, No. 744 (fr.); rocky woods north of Dumbell lake, Pancake pt., July 15, No. 745 (fr.); maple woods, elevation 1,900 feet, Mamainse mt., July 23, No. 746 (fr.).

**Trillium cernuum** L., var. **macranthum** Eames and Wieg.—See Rhod. 25: 191 (1923).

Mixed hardwoods, Batchawana is., September 11, No. 767 (fr.); bank of small creek, Mamainse pt., September 2, No. 768 (fr.); edge of spring, Mamainse pt., July 13, No. 769 (fl.); maple woods, Corbeil pt., July 29, No. 770 (fr.); damp, mixed hardwoods, Carp lake, July 22, No. 771 (fr.); woods near river mouth, Carp river, September 6, No. 772 (fr.).

Although all the collections were too far advanced for accurate determination on the basis of floral characters, other considerations make it fairly certain that they belong with the variety rather than with the species.

## IRIDACEAE

***Iris versicolor* L.**

Low ground, Smith lake, July 23, No. 704 (fr.); stream bank, Mamainse pt., July 13, No. 703 (fl.); swamp, Pancake bay, July 12, No. 702 (fl.); damp, peaty soil, Pancake pt., August 1, No. 701; swamp, Batchawana is., September 10, No. 700 (fr.); black spruce swamp, Corbeil pt., July 24, No. 699 (fl.).

***Sisyrinchium angustifolium* Mill.**

Sandy soil, Batchawana falls, August 28, No. 708 (fr.); damp clay soil, Havilland bay, August 12, No. 707 (fr.); low places on sand beach, Sand pt., September 12, No. 706 (fr.); crevices of sandstone, Corbeil pt., August 14, No. 705 (fr.).

## ORCHIDACEAE

***Cypripedium acaule* Ait.**

Hardwood bush, Carp lake, September 6, No. 781 (fr.); mixed woods, Batchawana falls, August 27, No. 782 (lv.); spruce-tamarack swamp, Corbeil pt., August 8, No. 783 (fr.); in sandy soil in mixed hardwoods, Pancake bay, July 13, No. 784 (fl.); swampy woods, Dumbell lake, Pancake pt., July 15, No. 785 (fl.).

***Habenaria viridis* (L.) R. Br., var. *bracteata* (Muhl.) A. Gray.—*H. bracteata* (Muhl.) R. Br. See Rhod. 28: 174 (1926).**

Damp soil in maple woods, elevation 1,900 feet, Mamainse mt., July 23, No. 787 (fr.); edge of tote road, Corbeil pt., July 16, No. 791 (fl.); Batchawana falls, August 27, No. 792 (fr.); in hardwoods, near river mouth, Carp river, September 6, No. 793 (fr.); in sandy woods, Pancake bay, July 12, No. 790 (fl., fr.); in mixed hardwood bush, Gimlet Creek trail, Pancake bay, July 15, No. 789 (fr.); in leaf soil, maple woods, Elderberry hill, Pancake pt., July 17, No. 788 (fl.); cedar swamp, Carp lake, July 25, No. 786 (fl., fr.).

***Habenaria hyperborea* (L.) R. Br.**

Swampy ground, Xyris swamp, Pancake pt., August 16, No. 869 (fr.); carex swamp, Corbeil pt., July 24, No. 868; swampy ground, Pancake river, September 4, No. 867 (fr.); swamp, Batchawana is., September 10, No. 809 (fr.); damp bank by river mouth, Pancake river, July 31, No. 810 (fr.); wet turf on beach, Corbeil pt., August 1, No. 811 (fr.); damp slope in birch woods, Sault Ste. Marie, July 10, No. 812 (fr.).

***Habenaria dilatata* (Pursh) Hook.**

In pockets on moist rocky bank, Batchawana falls, August 28, No. 806 (fl.); spruce-sphagnum bog, Pancake pt., July 23, No. 807 (fl.); in sphagnum in cedar swamp, Dumbell lake, Pancake pt., July 15, No. 808 (fl.).



**Habenaria clavellata** (Michx.) Spreng.

In floating bog at edge of Cross lake (near Carp lake), July 25, No. 794 (fl.); sphagnum bog, Pancake pt., July 23, No. 795 (fl.); black spruce-sphagnum bog, Corbeil pt., July 22, No. 796 (fl.); swamp, Island lake, August 22, No. 797 (fr.); swamp, Batchawana is., September 10, No. 798 (fr.).

**Habenaria obtusata** (Pursh) Richardson.

Spruce-sphagnum bog, Batchawana is., September 11, No. 798 (fr.); cedar swamp, Pancake pt., August 22, No. 799 (fr.); cedar swamp, Gimlet Creek trail, Pancake bay, July 12, No. 800 (fl.); swampy wood, Xyris swamp, Pancake pt., August 5, No. 801 (fr.); cedar swamp in sphagnum, Corbeil pt., July 15, No. 802 (fl.); black spruce swamp, Beaver Meadow creek, Pancake pt., July 17, No. 803 (fl.).

**Habenaria orbiculata** (Pursh) Torr.

Wet woods, Batchawana falls, August 29, No. 863 (fr.); hardwoods, Smith lake, July 18, No. 864 (fl.).

**Habenaria lacera** (Michx.) R. Br.

Spruce-cedar-carex swamp, Corbeil pt., July 24, No. 804 (fl.); swampy ground, Xyris swamp, Pancake pt., August 16, No. 805 (fr.).

**Habenaria psychodes** (L.) Spreng.

Stream bank, Carp lake, July 25, No. 865 (fl.); low places, Sand pt., September 12, No. 813 (fr.); rocky river bank, Batchawana falls, August 28, No. 866.

**Pogonia ophioglossoides** (L.) Ker.

Swampy ground, Xyris swamp, Pancake bay, August 16, No. 895 (fr.); sphagnum bog, Pancake pt., July 23, No. 896 (fl.); swampy ground, Xyris swamp, Pancake pt., August 5, No. 890 (fl.); swamp, Island lake, August 22, No. 897 (fr.).

**Calopogon pulchellus** (Sw.) R. Br.

Swampy ground, Xyris swamp, Pancake pt., August 16, No. 774 (fr.); swampy ground, Sawpit bay, August 21, No. 775 (fr.); swampy ground, Xyris swamp, Pancake pt., August 5, No. 776 (fl.).

**Arethusa bulbosa** L.

Spruce-cedar-carex swamp, Corbeil pt., July 24, No. 773 (fl.).

**Spiranthes Romanzoffiana** Cham.

Swampy places, Xyris swamp, Pancake pt., August 5, No. 893 (fl.); swampy ground, Xyris swamp, Pancake pt., August 16, No. 894 (fl.); open poplar association, Corbeil pt., August 5, No. 892 (fl.); roadside ditch, Batchawana bay, July 22, No. 891.

**Goodyera repens** (L.) R. Br., var. **ophioides** Fern.

Wet, sandy soil, Coppermine pt., September 2, No. 881 (fr.); dry, mixed woods, Pancake pt., August 16, No. 878 (fl.); swampy woods, Xyris swamp, Pancake pt., August 5, No. 874 (fl.); cedar swamp, 1 mile east of Pancake camp, Pancake pt., July 29, No. 871 (fl.).

**Goodyera tessellata** Lodd.

Damp woods, Corbeil pt., August 9, No. 888 (fl.); dry, mixed woods, Xyris swamp, Pancake pt., August 16, No. 880 (fl.); mixed deciduous woods, Batchawana falls, August 27, No. 877 (fr.); cedar-yellow birch stand, Carp lake, July 25, No. 876 (fl.); mixed deciduous woods, Carp lake, July 25, No. 875 (fl.); spruce-tamarack stand, Corbeil pt., August 8, No. 873 (fl.); cedar stand, Pancake river, July 29, No. 872 (fl.); balsam-cedar association, Corbeil pt., August 1, No. 870 (fl.).

**Goodyera decipiens** (Hook.) Hubbard.—*G. Menziesii* Lindl.

Mixed deciduous woods, Carp lake, August 2, No. 885 (fl.); cedar swamp, Pancake bay, July 12, No. 886 (fl.); cedar-spruce stand, Pancake pt., August 3, No. 887 (fl.); cedar swamp, 1 mile west of Pancake camp, Pancake pt., July 29, No. 889 (fl.).

**Goodyera pubescens** (Willd.) R. Br.

Dry, mixed woods, Pancake pt., August 16, No. 879 (fr.); mixed woods, Batchawana falls, August 27, No. 882 (fr.); moist mixed woods, Batchawana falls, August 28, No. 883 (fr.); woods, Batchawana falls, August 29, No. 884 (fr.).

**Listera cordata** (L.) R. Br.

Spruce-cedar-carex swamp, Corbeil pt., July 24, No. 907 (fl.); cedar swamp, Pancake bay, July 12, No. 908 (fl.).

**Listera auriculata** Wieg.

Along creek under alders, Pancake bay, September 7, No. 900 (fr.).

**Listera convallarioides** (Sw.) Nutt.

Swampy ground, Xyris swamp, Pancake pt., August 16, No. 901 (fr.); cedar swamp, Pancake pt., August 22, No. 902 (fr.); edge of spring, Mamainse pt., July 13, No. 903 (fl.); cedar swamp, Corbeil pt., July 15, No. 904 (fl.); cedar swamp, Pancake pt., July 17, No. 905 (fl.); wet places, cedar swamp, Dumbell lake, Pancake pt., July 15, No. 906 (fl.).

**Malaxis unifolia** Michx.—*Microstylis unifolia* (Michx.) BSP.

Moist, rocky pockets, east ridge, Havilland bay, August 12, No. 898 (fr.); sphagnum bog, Pancake pt., July 23, No. 899 (fl.).

**Corallorrhiza maculata** Raf.

Coniferous woods, Mamainse pt., July 13, No. 909 (fl.); mixed woods on Carp ridge, Carp lake, August 2, No. 777 (fr.); poplar-birch slope, Corbeil pt., July 28, No. 778 (fr.); mixed coniferous woods, Mamainse pt., September 2, No. 779 (fr.); birch woods, Batchawana is., September 11, No. 780 (fr.).

## SALICACEAE

**Populus tremuloides** Michx.

Sandy shore, Pancake bay, July 16, No. 1159 (lv.); roadside, Pancake river, August 22, No. 1160 (lv.); open, rocky woods, Mamainse pt., September 2, No. 1161 (lv.).

**Populus grandidentata** Michx.

River bank, Carp lake, July 24, *No. 1157* (lv.); poplar-birch slope, Corbeil pt., July 28, *No. 1158* (lv.).

**Populus tacamahacca** Mill.—*P. balsamifera* Du Roi and some Am. auth., not L. *See Jour. Arn. Arb. 1: 61* (1919).

Sandy shore, Pancake bay, July 16, *No. 1162* (lv.).

**Salix lucida** Muhl.

Swamp, Batchawana is., September 1, *No. 1173* (lv.); gravel bars, Batchawana falls, August 28, *No. 1174* (fr.).

**Salix longifolia** Muhl.

Sand beach, Batchawana is., September 13, *Nos. 1171, 1172* (fr.).

**Salix pyrifolia** Anderss.—*S. balsamifera* Barratt. *See Rhod. 16: 116* (1914).

Low ground, Sawpit bay, August 21, *No. 2415* (fr.); alnus-carex association, Corbeil pt., July 26, *No. 2531* (fr.).

**Salix pedicellaris** Pursh, var. **hypoglauca** Fern.—*S. pedicellaris* Auth. in part, not Pursh; *S. myrtilloides* Auth. in part, not L. *See Rhod. 11: 161* (1909).

Xyris swamp, Pancake pt., August 16, *No. 1175* (lv.).

**Salix discolor** Muhl.

Open-grown poplar, Corbeil pt., July 29, *No. 1168* (lv.); alder swamp, Corbeil pt., August 8, *No. 1169* (lv.); open-grown poplar, Corbeil pt., July 29, *No. 1170* (lv.).

**Salix Bebbiana** Sarg.—*S. rostrata* Auth. *See Jour. Arn. Arb. 2: 68* (1920); *Rhod. 26: 122* (1924).

Lake shore, Carp lake, September 5, *No. 1163* (lv.); river bank, Pancake river, September 4, *No. 1164* (fr.); dry gravel roadside, Mamainse pt., July 13, *No. 1165* (fr.); open poplar association, Corbeil pt., August 5, *No. 1166* (lv.); shores, Carp lake, September 5, *No. 1167* (fr.).

## MYRICACEAE

**Myrica Gale** L.

Water's edge, Smith lake, July 23, *No. 1990* (fr.); lake margin, Dumbell lake, Pancake pt., July 15, *No. 1991* (fr.); sandy soil, mouth of creek, Pancake bay, July 22, *No. 1992* (fr.); Batchawana is., September 10, *No. 1993* (fr.).

## BETULACEAE

**Ostrya virginiana** (Mill.) K. Koch.

Hardwoods, Carp lake, September 5, *No. 844* (fr.); hill-top, Elderberry hill, Pancake bay, July 17, *No. 845* (fr.).

**Corylus rostrata** Ait.

Rocky woods, Dumbell lake, July 15, *No. 1358* (fr.); roadside, Pancake road, September 6, *No. 1359* (fr.); hill-side, Carp lake, September 5, *No. 1360* (fr.); Pancake river, September 4, *No. 1361* (lv.).

**Betula lutea** Michx. f.

River bank, Batchawana falls, August 27, *No. 2540* (fr.); in maple association, Smith lake, July 23, *No. 2541* (lv.).

**Betula papyrifera** Marsh.

Open, sandy woods near camp, Pancake bay, July 22, Nos. 2544, 2545, 2546 (fr.); ridge east of Havilland bay, August 12, No. 2647 (fr.); in mixed woods, Batchawana is., September 10, No. 2548 (fr.).

**Betula papyrifera** Marsh., var. **cordifolia** (Regel) Fern.

Bank of lagoon, Pancake bay, August 4, No. 2542 (lv.); rooted talus slope, Batchawana falls, August 29, No. 2543 (fr.).

**Betula pumila** L., var. **glandulifera** Regel.

In sphagnum in Xyris swamp, Pancake pt., August 16, Nos. 2538, 2539 (fr.).

**Alnus crispa** (Ait.) Pursh; var. **mollis** Fern.—*A. mollis* Fern. See Rhod. 15: 44 (1913).

Gravel beach, Batchawana falls, August 28, No. 836 (fr.); Batchawana falls, August 27, No. 837 (fr.); Batchawana falls, August 29, No. 838 (fr.).

**Alnus incana** (L.) Moench.

River bank, Batchawana river, July 31, No. 839 (fr.); river bank, Carp river, July 29, No. 840 (fr.); wet sand, Harmony river, July 24, No. 841 (lv.); shore of pond, Sand pt., September 12, No. 842 (lv.); sandy soil, Pancake bay, July 22, No. 843 (fr.).

## FAGACEAE

**Quercus borealis** Michx. f.—*Q. rubra* many Am. auth., not L. See Rhod. 18: 45 (1916).

Hill-top, Mamainse mt., July 17, No. 1352 (fr.); sandy ridge, Hardpan swamp, Pancake bay, August 1, No. 1353 (fr.); woods, Pancake pt., September 5, No. 1354 (fr.); oak-maple-hornbeam stand, Batchawana is., September 13, No. 1355 (fr.).

**Quercus borealis** Michx. f., var. **maxima** (Marsh.) Ashe.—*Q. rubra* Du Roi and many Am. auth., not L. See Proc. Soc. Am. Foresters 11: 90 (1916).

Deciduous woods, Batchawana is., September 9, No. 1356 (fr.); rocky ledges, east ridge, Havilland bay, August 12, No. 1357 (fr.).

## URTICACEAE

**Ulmus fulva** Michx.

Batchawana river, August 30, No. 2436 (lv.).

**Ulmus americana** L.

Mountain-top, elevation 1,900 feet, Mamainse mt., July 18, No. 2431 (lv.); thin soil, ridge top, Pancake pt., July 13, No. 2432 (lv.); beaver meadow, Cross lake (near Carp lake), July 25, No. 2433 (lv.); in good soil, mouth of Carp river, July 22, No. 2434 (lv.); bank of Pancake river, September 4, No. 2435 (lv.).

**Urtica gracilis** Ait.—*U. Lyallii* eastern Am. Auth., not Wats., not *U. gracilis* of most Am. Auth. See Rhod. 28: 193 (1926).

Edge of old clearing, Batchawana is., September 9, No. 2437 (fl.); trail to Harmony river, September 3, No. 2438 (fl.).

## SANTALACEAE

**Comandra Richardsiana** Fern.

Sandy woods, Pancake bay, July 12, No. 2416 (fr.).

**Geocaulon lividum** (Richards.) Fern.—*Comandra livida* Richardson. See Rhod. 30: 23 (1928).

Sphagnum hummocks, Xyris swamp, Pancake pt., August 16, No. 2421 (fr.); black spruce-sphagnum bog, Corbeil pt., July 15, No. 2422 (fr.); sphagnum-spruce association, Batchawana bay, July 19, No. 2423 (fr.).

## LORANTHACEAE

**Arceuthobium pusillum** Peck.

On black spruce, Dumbell lake, July 15, No. 1791 (fl.).

## POLYGONACEAE

**Rumex crispus** L.

Clearing, Batchawana village, August 14, No. 2003 (fr.); low places, Batchawana village, August 14, No. 2004 (fr.).

**Rumex obtusifolius** L.

Low places, Batchawana village, August 14, No. 2005 (fr.); wagon road, Mamainse pt., July 25, No. 2006 (fl.); field, Stony pt., August 23, No. 2007 (fr.); damp loam, Mamainse road, August 2, No. 2008 (fr.); wet ground, Mamainse road, July 22, No. 2009 (fr.); wet places, Batchawana village, August 14, No. 2010 (fr.).

**Rumex acetosella** L.

Open sandy soil at camp, Pancake river, July 12, No. 1999 (fl.); roadway in maple-yellow birch association, Mamainse pt., July 23, No. 2000 (fl.); wagon road, Batchawana is., September 11, No. 2001 (fr.); tote road at old camp, Pancake pt., September 6, No. 2002 (fr.).

**Polygonum aviculare** L.

Clearing, copper mine, Carp lake, September 2, No. 2011 (fl.); clearing, Coppermine pt., August 20, No. 2012 (fl.); roadside, Batchawana village, August 14, No. 2013 (fl.).

**Polygonum Douglasii** Greene.

Dry sand, Sand pt., September 12, No. 2020 (fl., fr.); roadside, Haviland bay, August 12, No. 2021 (fr.); thin humus on rocks, Fawn hill, Pancake river, July 31, No. 2022 (fr., fl.); beach, Batchawana is., September 13, No. 2023 (fr.); thin soil, Coppermine pt., August 20, No. 2024 (fl., fr.).

**Polygonum lapathifolium** L.

Pancake camp, August 23, No. 2471 (fl.).

**Polygonum scabrum** Moench.—*P. tomentosum* (Schränk) Gürke. See Rhod. 23: 259 (1921).

Roadside, Batchawana bay, July 22, No. 2043 (fr.); damp sand, road in recent burn, Mamainse road, August 2, No. 2044 (fl., fr.).



**Polygonum natans** A. Eaton, f. **genuinum** Stanford.—*P. amphibium* Small and many other Am. Auth., not L. See Rhod. 27: 158 (1925).

In water, Dumbell lake, Pancake pt., July 15, No. 2031 (fl.); shallow water in lagoon, Batchawana is., September 11, No. 2032 (fl.); shallow water, Sawpit bay, August 21, No. 2033 (fl.).

**Polygonum natans** A. Eaton, f. **Hartwrightii** (Gray) Stanford.—*P. amphibium* var. *Hartwrightii* (Gray) Bissell. See Rhod. 27: 160 (1925).

Damp ground, Sawpit bay, August 21, No. 2034 (fl.); beaver meadow, Batchawana river, August 29, No. 2035 (fl.); swampy ground, Batchawana is., September 11, No. 2036 (fl.).

**Polygonum Persicaria** L.

Low places, Chapman's field, Corbeil pt., August 23, No. 2037 (fl., fr.); shallow water, Havilland bay, August 13, No. 2038 (fl., fr.); low ground, clearing, Batchawana is., September 11, Nos. 2040, 2039 (fl., fr.); dry, gravelly soil, Carp river, July 24, No. 2047 (fl.).

**Polygonum Hydropiper** L., var. **projectum** Stanford.—*P. Hydropiper* of many Am. Auth. See Rhod. 29: 86 (1927).

Low ground, clearing, Batchawana is., September 11, No. 2025 (fl., fr.); shallow water, Havilland bay, August 13, No. 2026 (fl.); low places, Chapman's field, Corbeil pt., August 23, No. 2027 (fl.); marshy ground, Batchawana is., September 11, No. 2028 (fl., fr.); Batchawana village, August 14, No. 2029 (fl.); low ground, clearing, Batchawana is., September 11, No. 2030 (fr.).

**Polygonum sagittatum** L.

Wet soil, Carp river, July 24, No. 2041 (fl.); shallow water with carices, Havilland bay, August 13, No. 2042 (fl.).

**Polygonum Convolvulus** L.

Roadside, Pancake camp, Pancake river, August 10, No. 2016 (fr.); sandy ground, Pancake bay, July 22, No. 2017 (fl.); maple association, Corbeil pt., July 29, No. 2018 (fl., fr.); clearing, Pancake camp, Pancake river, August 23, No. 2019 (fl., fr.).

**Polygonum cilinode** Michx.

Maple association, Carp lake, July 25, No. 2014 (fl.); sandy places, edge of woods, Pancake bay, July 12, No. 2015 (fl.).

**Fagopyrum esculentum** Moench.

Sandy clearing at camp, Pancake river, July 12, No. 2470 (fl.).

**Polygonella articulata** (L.) Meisn.

Sand beach, lagoon, Pancake bay, August 10, No. 2472 (fl.); shores, Batchawana is., September 12, No. 1994 (fl.); sandy beach, Pancake bay, August 1, No. 2047a (fl.); sand, Harmony river, September 3, No. 1995 (fl.); lake shore, Pancake bay, September 7, No. 1996 (fl.); sand beach, Pancake bay, August 22, No. 1997 (fl.); beach association, Pancake bay, August 21, No. 1998 (fl.).

## CHENOPODIACEAE

**Chenopodium capitatum** (L.) Asch.

Clearing, Coppermine pt., August 20, No. 1245 (fr.); light soil, Dumbell lake, Pancake pt., July 27, No. 1246 (fr.).

**Chenopodium hybridum** L.

Thin soil over rock, east ridge, Havilland bay, August 12, No. 1243 (fr.); thin, rocky soil, Carp lake, August 2, No. 1244 (fl., fr.); talus slope, Batchawana falls, August 29, No. 2458 (fr.).

**Chenopodium album** L.

Sandy clearing, Pancake bay, August 23, No. 1241 (fl.); clearing, Batchawana is., September 11, No. 1242 (fr.).

**Chenopodium polyspermum** L.

Roadside, Mamainse pt., September 2, No. 2475 (fr.).

## AMARANTHACEAE

**Amaranthus retroflexus** L.

Roadside, Mamainse pt., September 2, No. 2468 (fr.).

## CARYOPHYLLACEAE

**Stellaria borealis** Bigel. See Rhod. 16: 144 (1914).

Wagon road, Batchawana is., September 11, No. 2462 (fr.); alder swamp, Corbeil pt., July 26, No. 1255 (fl., fr.).

**Stellaria longifolia** Muhl.

Damp fields, Corbeil pt., July 29, No. 1252 (fl., fr.).

**Stellaria graminea** L.

Black ash swamp, Sault Ste. Marie, July 3, No. 1254 (fl.); roadside ditch, Corbeil pt., August 4, No. 1253 (fl.).

**Stellaria media** (L.) Cyrill.

In wet clay under mixed deciduous hardwoods, Corbeil pt., August 2, No. 1256 (fl.).

**Cerastium vulgatum** L.

Sandy road, Mamainse pt., July 23, No. 1249 (fl.); sandy road, Sault Ste. Marie, July 10, No. 1250 (fl.); damp sand, Havilland bay, August 13, No. 1251 (fl.); shores, Batchawana is., September 12, No. 1248 (fl.).

**Sagina nodosa** (L.) Fenzl.

Rock crevices on shore, Pancake pt., August 3, No. 910 (fl.); damp, gravelly beach, Mamainse pt., July 13, No. 911 (yng. fl.); damp rock crevices at water's edge, Corbeil pt., August 1, No. 912 (fl.).

**Arenaria dawsonensis** Britton.—*A. litorea* Fern. See Rhod. 28: 199 (1926).

Dry lava slope, Mamainse pt., July 13, No. 913 (fl., fr.).

**Spergula arvensis** L.

Roadside gravel, Pancake bay, August 22, No. 1264 (fl., fr.).

**Silene antirrhina** L., var. **divaricata** Robinson.

Open rocks, east ridge, Havilland bay, August 12, Nos. 1261, 1260 (fr.).

**Silene noctiflora** L.

Sand beach, Harmony creek, September 16, No. 1257 (fr.); fields, Stony pt., August 23, No. 1258 (fr.); in gravel by roadside, Pancake pt., August 22, No. 1259 (fl.).

**Silene latifolia** (Mill.) Britten and Rendle.

Cleared land, 2 miles up Pancake river, July 27, No. 1262 (fr.); sandy beach, Pancake bay, July 22, No. 1263 (fr.).

#### NYMPHAEACEAE

**Nymphozanthus variegatus** (Engelm.) Fern.—*Nymphaea advena*, var. *variegata* (Engelm.) Fern. See Rhod. 21: 187 (1919).

In 18 inches of water, Cross lake (near Carp lake), July 25, No. 2410; shallow, muddy water, Island lake, August 22, No. 1986 (fl., fr.); quiet water, Carp river, July 24, No. 1987 (fl.); in 3 to 4 feet of open water, Dumbell lake, Pancake pt., July 15, No. 1988 (fl.); shallow lagoon in mud, Batchawana is., September 11, No. 1989 (fr.).

**Nymphaea odorata** Ait.—*Castalia odorata* of various authors. See Rhod. 18: 161 (1916).

Shallow water, mud, Island lake, August 22, No. 1984 (fl.); muddy water, Carp lake, August 2, No. 1985 (fl.).

**Nymphaea tuberosa** Paine.—*Castalia tuberosa* of various authors.

In 2 to 3 feet of water, muddy bottom, Island lake, August 22, No. 1983 (fl.).

**Brasenia Schreberi** Gmel.

In 2 to 3 feet of water, muddy bottom, Island lake, August 22, No. 1981 (fl.); stagnant pond, Sand pt., September 12, No. 1982 (fl.).

#### RANUNCULACEAE

**Caltha palustris** L.

Swamp, Batchawana is., September 9, No. 2239 (lv.); boggy ground, Carp river, July 29, No. 2240 (fr.); maple-yellow birch association, damp ground, Mamainse pt., July 23, No. 2241 (lv.).

**Coptis groenlandica** (Oeder) Fern.—*C. trifolia* (L.) Salisb. in part only. See Rhod. 31: 142 (1929).

Cedar-yellow birch association, Cross lake (near Carp lake), July 25, No. 2247 (fr.); swamp, Batchawana is., September 13, No. 2248 (fr.); swampy woods, Pancake camp, Pancake river, July 13, No. 2249 (fr.); black spruce-sphagnum bog, Corbeil pt., July 15, No. 2250 (fr.); Batchawana is., September 12, No. 2439 (fr.).

**Actaea alba** (L.) Mill.

Damp woods, east ridge, Havilland bay, August 13, No. 2209 (fr.); Batchawana falls, August 27, No. 2213 (fr.); Carp lake, September 6, No. 2210 (fr.); tolerant hardwoods, on ridge, Batchawana river, August 28, No. 2211 (fr.); maple woods, Batchawana falls, August 27, No. 2212 (fr.).

**Actaea rubra** (Ait.) Willd.

Poplar-birch slope, Corbeil pt., July 27, No. 2216 (fr.); river bank, Harmony river, July 23, No. 2217 (fr.); wet mixed woods, Mamainse road, July 22, No. 2218 (fr.); mixed woods, Mamainse pt., July 13, No. 2219 (fr.); Pancake river, September 4, No. 2221 (fr.); low woods, Batchawana is., September 9, No. 2222 (fr.).

**Actaea rubra** (Ait.) Willd., f. **neglecta** (Gillm.) Robinson.

Roadside, cut-over land, Coppermine pt., August 20, No. 2220 (fr.); maple-yellow birch association, Corbeil pt., July 23, No. 2215 (lv.); Batchawana is., September 9, No. 2223 (fr.); maple woods, Dumbell lake, Pancake pt., August 3, No. 2224 (fr.).

**Aquilegia canadensis** L.

Talus slope, Batchawana falls, August 29, No. 2237 (fr.); gravel soil, Mamainse pt., July 13, No. 2238 (fr.).

**Anemone canadensis** L.

Wet, grassy sand, roadway, Mamainse pt., July 23, No. 2225 (fr.); creek edge, Mamainse pt., September 2, No. 2226 (fr.); edge of beaver meadow, Batchawana river, August 27, No. 2227 (fr.); wet sand, Mamainse pt., July 13, No. 2228 (fl.); rocky shore, Mamainse pt., July 13, No. 2229 (fl., fr.).

**Anemone quinquefolia** L., var. **interior** Fern. See Rhod. 37: 260 (1935).

Creek bank, Mamainse pt., September 2, No. 2230; damp bank, Batchawana falls, August 27, Nos. 2231, 2233; river bank, Batchawana falls, August 28, No. 2232; bank of stream near the mouth, Harmony river, August 13, No. 2234; mossy hummock in open-grown poplars, Corbeil pt., July 31, No. 2236.

All specimens have leaves only, the fruits having been shed.

**Hepatica americana** (DC.) Ker.—*H. triloba* Am. auth., not Gilib. See Rhod. 19: 45 (1917).

Rich woods, Batchawana river, August 27, No. 2251 (lv.); coniferous woods, Coppermine pt., August 20, No. 2252 (lv.); maple woods, Sault Ste. Marie, July 9, No. 2253 (lv.).

**Clematis virginiana** L.

Talus, Batchawana falls, September 29, No. 2242 (fr.); gravel bar, Batchawana river, August 28, Nos. 2243 (fl.), 2244 (fr.); edge of alder swamp, Havilland bay, August 13, No. 2245 (fl., fr.); moist sand bank, Pancake river, July 27, No. 2246 (fl.).

**Ranunculus reptans** L.—*R. Flammula* L., var. *reptans* (L.) Mey. See Rhod. 19: 135 (1917).

Damp, peaty soil, Hardpan swamp, Pancake pt., August 9, No. 2269 (fl., fr.); beach, Pancake bay, July 16, No. 2270 (fl., fr.); sandy bank, Batchawana river, August 28, No. 2271 (fl., fr.); wet sand by river, Batchawana falls, August 27, No. 2272 (fl.).

**Ranunculus abortivus** L.

Dry coniferous woods, Coppermine pt., August 20, No. 2265 (lv.).

**Ranunculus recurvatus** Poir.

Damp loam, Mamainse tote road, August 2, No. 2262 (fr.); creek bank, Batchawana falls, August 28, No. 2263 (fr.); moist soil, Batchawana falls, August 27, No. 2264 (lv.).

**Ranunculus septentrionalis** Poir.

Roadside ditch, Corbeil pt., July 31, No. 2267 (fl.); wet clay, Gimlet Creek trail, Pancake river, July 29, No. 2268 (fl., fr.).

**Ranunculus pennsylvanicus** L. f.

Damp sand, beaver meadow, Pancake bay, July 23, No. 2254 (fl.); rock crevices, Mamainse pt., July 23, No. 2255 (fr.); low ground, clearing, Batchawana is., September 11, No. 2256 (fl., fr.); low places, Batchawana village, August 14, Nos. 2257, 2258 (fr.); sand at mouth of Harmony river, September 3, No. 2261 (fr.).

**Ranunculus acris** L.

Gimlet creek, Pancake bay, July 12, No. 2273 (fl., fr.); loam roadway, Mamainse pt., July 23, No. 2274 (fr.); wagon road, damp, Mamainse pt., July 23, No. 2275 (fr.); meadow, Mamainse pt., September 2, No. 2276 (fl., fr.).

**Thalictrum dioicum** L.

Mixed woods, bottom lands, Carp river, July 15, No. 2277 (fr.); maple woods, Batchawana river, August 27, No. 2278 (lv.).

**Thalictrum polygamum** Muhl.

Cedar-yellow birch association, Cross lake (near Carp lake), July 25, No. 2280 (fr.); gravel beach, Batchawana falls, August 28, No. 2281 (fl., fr.); river bank, Pancake river, July 12, No. 2279 (♂ fl., fr.).

## PAPAVERACEAE

**Sanguinaria canadensis** L.

Damp soil, maple association, Mamainse pt., July 23, No. 1967 (lv.); rich loam, mixed deciduous woods, Corbeil pt., July 15, No. 1968 (lv.); mixed deciduous woods, Corbeil pt., July 29, No. 1969 (lv.); hardwoods, Pancake pt., September 6, No. 1970 (lv.); moist gully in hardwoods, Batchawana falls, August 29, No. 1971 (lv.).

## FUMARIACEAE

**Corydalis sempervirens** (L.) Pers.

Gravel roadside, Mamainse pt., July 13, No. 1308 (fl.); rock crevices, Mamainse pt., July 23, No. 1309 (fl.); thin soil, east ridge, Havilland bay, August 12, No. 1310 (fl.); gravelly places, Mamainse pt., July 13, No. 1311 (fl., fr.).

**Corydalis aurea** Willd.

Sandy roadside, Coppermine pt., September 2, No. 1312 (fl.); lava slopes, Mamainse pt., July 13, No. 1313 (fl., fr.); gravel roadside, Mamainse pt., July 13, No. 1314 (fl., fr.).



## CRUCIFERAE

**Thlaspi arvense** L.

Roadside, Mamainse pt., September 2, No. 1960 (fl., fr.); camp clearing, Pancake bay, August 23, No. 1961 (fr.); sandy camp clearing, Pancake bay, July 12, No. 1962 (fl., fr.).

**Lepidium apetalum** Willd.

Gravelly soil, Batchawana village, August 14, No. 1949 (fr.).

**Lepidium campestre** (L.) R. Br.

Dry ground, Mamainse road, July 22, No. 1950 (fr.).

**Capsella Bursa-pastoris** (L.) Medic.

Camp clearing, Pancake bay, August 23, No. 1935 (fl., fr.); sandy open soil, camp clearing, Pancake bay, July 27, No. 2045 (fl., fr.).

**Neslia paniculata** (L.) Desv.

Roadway, Mamainse pt., September 2, No. 1951 (fl., fr.); camp clearing, Pancake bay, August 23, No. 1952 (fl., fr.); sandy open soil, camp clearing, Pancake camp, July 27, No. 1953 (fl., fr.).

**Brassica arvensis** (L.) Ktze.

Camp clearing, Pancake bay, August 17, No. 1932 (fl., fr.); clearing, Pancake camp, July 12, Nos. 1933, 1934 (fl., fr.).

**Sisymbrium incisum** Engelm., var. **Hartwegianum** (Fourn.) Wats.

Rocky soil, Coppermine pt., August 20, No. 1080 (fl., fr.); gravel, Mamainse pt., July 13, No. 1959 (fl., fr.).

**Erysimum cheiranthoides** L.

Pancake road, September 6, No. 1943 (fr.); roadside, Mamainse harbour, September 2, No. 1944 (fr.); camp clearing, Pancake bay, August 23, No. 1945 (fl., fr.); dry gravelly roadside, Corbeil pt., July 15, No. 1946 (fl.); sandy camp clearing, Pancake camp, July 12, No. 1947 (fl., fr.); tote road, Corbeil pt., July 15, No. 1948 (fl., fr.).

**Amoracia aquatica** (Eaton) Wieg.—*Radicula aquatica* (Eaton) Robinson. See Rhod. 27: 186 (1925).

Beaver pond, Batchawana falls, August 29, No. 1931 (lv.).

**Rorippa palustris** (L.) Bess., var. **glabrata** (Lunell) Vict.—*Radicula palustris* Am. auth., not Moench. See Contrib. Lab. Bot. Univ. Montréal No. 17: 15 (1930).

Tote road, southeast of Pancake river, July 15, No. 1954 (fl.).

**Rorippa palustris** (L.) Bess., var. **hispida** (Desv.) Rydb.—*Radicula palustris*, var. *hispida* (Desv.) Robinson. See Contrib. Lab. Bot. Univ. Montreal, No. 17: 16 (1930).

Roadside, Pancake bay, July 31, No. 1955 (fl., fr.); low, sandy soil, at mouth of small creek, Havilland tp., September 16, No. 1956 (fl., fr.); sand between boulders, Batchawana river, August 27, No. 1957 (fl., fr.); beaver meadow, Batchawana falls, August 27, No. 1958 (fl., fr.).

**Cardamine parviflora** L., var. **arenicola** (Britton) O. E. Schultze.—*C. parviflora* Am. auth., not L. See Rhod. 29: 192 (1927).

Thin soil in open, east ridge, Havilland bay, August 13, No. 1936 (fr.).

***Cardamine pennsylvanica* Muhl.**

Damp ground, Mamainse tote road, July 22, *No. 2046* (fr.); margin of pool, cedar swamp, Gimlet creek, Pancake bay, July 12, *No. 1937* (fl., fr.); peaty, shaded soil, Hardpan swamp, Pancake bay, August 1, *No. 1938* (fl., fr.); damp sand by stream, beaver meadow, Pancake bay, July 23, *No. 1939* (fl., fr.); wet ground, Sawpit bay, August 21, *No. 1940* (fr.); Pancake river, September 4, *No. 1941* (fr.); damp ground by stream, Gimlet Creek trail, Pancake bay, July 12, *No. 1942* (fr.).

***Arabis brachycarpa* (T. and G.) Britton.**

Thin soil, Coppermine pt., August 20, *No. 1921* (fr.); thin soil over lava, Mamainse pt., September 2, *No. 1926* (fr.); talus, Carp lake, September 5, *No. 1922* (fr.); rock crevices, talus, Batchawana falls, August 29, *No. 1923* (fr.); thin, rocky soil, Carp lake, August 2, *Nos. 1924* (fr.), *1925* (fr.), *1927* (fl., fr.), *1929* (fr.); thin soil in open, east ridge, Havilland bay, August 12, *No. 1928* (fr.); talus slope, Gros Cap, July 11, *No. 1930* (fr.).

***Arabis retrofracta* Graham.**

Talus slope near old mine, Carp lake, August 2, *No. 2533* (fr.).

***Arabis glabra* (L.) Bernh.**

Thin soil, Elderberry hill, Pancake pt., July 17, *No. 1916* (fr.); gravel roadside, Mamainse pt., July 13, *No. 1917* (fl., fr.); gravelly soil, Batchawana village, August 14, *Nos. 1918, 1919* (fr.); thin soil, Coppermine pt., August 20, *No. 1920* (fr.).

## SARRACENIACEAE

***Sarracenia purpurea* L.**

Dumbell lake, Pancake pt., July 15, *No. 2424* (fl.); dead log in bog, Cross lake (near Carp lake), July 25, *No. 2425* (fl.).

## DROSERACEAE

***Drosera rotundifolia* L.**

In sphagnum, Pancake bay, July 23, *No. 2449* (fl., fr.); sand by rock pools, Batchawana falls, August 25, *No. 1225* (fl., fr.); in sphagnum, Island lake, August 22, *No. 1226* (fl., fr.); swamp, Batchawana is., September 2, *No. 1227* (fl.); on log in bog, Cross lake (near Carp lake), July 25, *No. 1228* (fl.); sphagnum bog, Dumbell lake, July 15, *No. 1229* (fl.); black spruce-sphagnum bog, Corbeil pt., July 22, *No. 1230* (fl.).

***Drosera intermedia* Hayne.**—*D. longifolia* L. in part.—See *Das Pflanzenreich* heft 26: 84 (1906).

*Xyris* swamp, Pancake pt., August 21, *No. 1231* (fl., fr.); swampy ground, Island lake, August 22, *No. 1232* (fl., fr.); *Xyris* swamp, Pancake pt., August 15, *No. 1234* (fl., fr.); swamp, Batchawana is., September 10, *No. 1235* (lv.); wet mud in bog, beaver meadow, Pancake bay, July 23, *No. 1236* (fl.); damp peaty soil, Hardpan swamp; Pancake bay, August 1, *No. 1237* (fl.).

## SAXIFRAGACEAE

**Saxifraga virginensis** Michx.

Rock crevices, Batchawana falls, August 29, No. 2346 (lv.); lava slopes, Mamainse pt., July 13, No. 2347 (fr.).

**Tiarella cordifolia** L.

Poplar-birch slope, Corbeil pt., July 28, No. 2345 (lv.).

**Mitella nuda** L.

Spruce-sphagnum bog, Batchawana is., September 11, No. 2406 (fr.); canyon, Carp river, September 6, No. 2339 (fr.); cedar swamp, Pancake pt., August 22, No. 2340 (fr.); cedar swamp, Elderberry hill, Pancake pt., July 17, No. 2341 (fr.); north shore, Batchawana is., September 12, No. 2342 (fr.); cedar woods, Mamainse pt., July 13, No. 2343 (fr.); north side of mountain, Carp lake, August 2, No. 2344 (fr.).

**Parnassia americana** Muhl.—*P. caroliniana* Am. auth., not Michx. See Addisonia 18: 43 (1934).

Swampy ground, Xyris swamp, Pancake bay, August 5, No. 2337 (fl.).

**Ribes oxycanthoides** L. See Rhod. 13: 73 (1911).

Open-grown poplar stand, Corbeil pt., July 31, No. 2358 (fr.); dry roadside, Mamainse pt., July 13, No. 2359 (fr.); thin soil, east ridge, Havilland bay, August 12, No. 2360 (fr.); cedar-spruce stand, Pancake bay, August 8, No. 2361 (fr.); gravelly soil, Batchawana village, August 14, No. 2362 (fr.).

**Ribes lacustre** (Pers.) Poir.

Poplar-birch slope, Corbeil pt., No. 2363 (fr.); open poplar woods, east ridge, Havilland bay, August 12, No. 2364 (fr.); edge of woods, Mamainse pt., July 13, No. 2365 (fr.); roadside, Coppermine pt., August 20, No. 2366 (fr.); lava crevices, Mamainse pt., September 2, No. 2367 (fr.).

**Ribes glandulosum** Grauer.—*R. prostratum* L'Her.

Stream edge, Mamainse pt., July 13, No. 2354 (fr.); talus slope, maple wood, Mamainse pt., July 23, No. 2355 (fr.); top of mountain, elevation 1,900 feet, Mamainse mt., July 18, No. 2356 (fr.); sandy ground at beach, Pancake bay, July 22, No. 2357 (fr.).

**Ribes triste** Pall.

Wet cedar woods, Corbeil pt., July 15, No. 2348 (fr.); maple woods, Pancake river, July 31, No. 2349 (fr.); north shore, Batchawana is., September 12, No. 2350 (lv.); rocky soil, maple association, Mamainse pt., July 23, No. 2351 (fr.); creek edge, Mamainse pt., September 2, No. 2352 (fr.); cedar-spruce association, wet depression, Corbeil pt., August 8, No. 2353 (fr.).

## ROSACEAE

**Physocarpus opulifolius** (L.) Maxim.

Rocky soil, Mamainse pt., July 13, No. 2442 (fl.); edge of stream, Mamainse pt., July 13, No. 2441 (fl.); Batchawana river, August 30, No. 2109 (fr.).

**Spiraea alba** Du Roi.—*S. salicifolia* Am. Auth.

Lagoon, Pancake river, August 10, Nos. 2163, 2168 (fl.); bog, edge of Carp lake, July 25, No. 2164 (fl.); Batchawana is., September 10, No. 2165 (fr.); beaver meadow, Batchawana river, August 29, No. 2166 (fr.).

**Spiraea latifolia** (Ait.) Borkh., var. **typica**. See Rhod. 19: 255 (1917).

Lagoon, Pancake river, August 10, No. 2167 (fl.).

**Sorbus americanus** Marsh.

Maple association, Mamainse mt., July 23, No. 2119 (lv.); tote road, Pancake pt., September 6, No. 2120 (fr.); camp clearing, Pancake river, July 26, No. 2121 (fl.); Batchawana is., September 10, No. 2122 (fr.); Mamainse harbour, September 8, No. 2169 (fr.).

**Aronia floribunda** (Lindl.) Spach.—*Pyrus arbutifolia*, var. *atropurpurea* (Britton) Robinson.

Lake margin, Dumbell lake, Pancake pt., July 15, No. 2124 (fr.); black spruce-sphagnum bog, Corbeil pt., July 22, No. 2170 (fr.); in sandy edge of pond, Sand pt., September 12, No. 2125 (fr.); carex swamp, Batchawana bay, August 14, No. 2126 (fr.).

**Aronia melanocarpa** (Michx.) Britton.—*Pyrus melanocarpa* (Michx.) Willd.

Sawpit bay, August 21, No. 2123 (fr.).

**Amelanchier sanguinea** (Pursh) DC.—*A. spicata* auth. See Rhod. 14: 138 (1912).

Gravelly soil, Batchawana village, August 14, No. 2174 (fr.); fields, Batchawana village, August 14, No. 2173 (fr.); fields, Batchawana village, August 14, No. 2172 (fr.).

**Amelanchier huronensis** Wieg. See Rhod. 22: 150 (1920).

Gravelly soil, Batchawana village, August 14, No. 2178 (fr.).

**Amelanchier huronensis** Wieg. X **laevis**.

Shores, Coppermine pt., August 20, No. 2177 (fr.).

**Amelanchier huronensis** Wieg. X.

Edge of woods, Mamainse pt., July 13, No. 2176 (fr.); open, rocky slopes, Havilland bay, east ridge, August 12, No. 2179 (fr.); edge of woods, shore, Mamainse pt., July 13, No. 2171 (fr.).

**Amelanchier stolonifera** Wieg.—*A. oblongifolia* of some Am. auth. in part. See Rhod. 14: 144 (1912).

Sandy woods, Pancake pt., July 12, No. 2175 (fr.); edge of lagoon, Pancake river, August 4, No. 2180 (fr.); although not quite typical these two collections are placed here.

**Amelanchier laevis** Wieg.—*A. canadensis* of many Am. auth. See Rhod. 14: 154 (1912).

Woods along beach, Pancake bay, August 22, No. 2188 (fr.); thin soil among rocks, Havilland bay, August 13, No. 2187 (fr.); Mamainse mt., July 18, No. 2189 (fr.).

**Amelanchier Bartramiana** (Tausch.) Roem.—*A. oligocarpa* (Michx.) Roem. See Rhod. 14: 158 (1912).

Open field, Stony pt., August 23, No. 2206 (fr.); sandy woods, Pancake pt., July 12, No. 2205 (fr.); edge of sandy woods, Pancake pt., July 12, No. 2204 (fr.); sandy soil, beach of Pancake bay, July 22, No. 2201 (fr.); sphagnum bog, Pancake pt., July 15, No. 2200 (fr.); maple association, Mamainse pt., July 23, No. 2199 (fr.); lava crevices, Mamainse pt., July 13, No. 2198 (fr.); mountain top, Mamainse mt., July 18, No. 2196 (fr.); maple woods, Batchawana falls, August 27, No. 2207 (fr.); mixed deciduous woods, Pancake pt., July 12, No. 2203 (fr.); open-grown poplar association, Corbeil pt., July 31, No. 2202 (fr.).

**Amelanchier Bartramiana X laevis.**

Mountain-top, Mamainse mt., July 18, No. 2196a (fr.); black spruce-sphagnum bog, Corbeil pt., July 22, No. 2197 (fr.); island, Smith lake, July 18, No. 2190 (fr.); summit, Mamainse mt., July 18, No. 2182 (fr.); mountain-top, Mamainse mt., July 18, No. 2181 (fr.); open poplar-birch association, Batchawana island, September 12, No. 2195 (fr.); lava crevices, Mamainse pt., July 13, No. 2192 (fr.); summit, Mamainse mt., July 18, No. 2185 (fr.); damp places, sandy woods, Pancake pt., July 12, No. 2191 (fr.); sandy woods, Pancake pt., July 12, No. 2193 (fr.); lava crevices, Mamainse pt., July 13, No. 2194 (fr.); gravelly soil, Batchawana village, August 14, No. 2183 (fr.); gravelly soil, Batchawana village, August 14, No. 2186 (fr.); edge of clearing, Mamainse tote road, July 22, No. 2184 (fr.).

**Crataegus Douglasii** Lindl.

Pancake river, September 4, No. 2060 (fr.); poplar-birch association, Batchawana is., September 12, No. 2061 (fr.); edge of woods, Pancake bay, July 13, No. 2062 (fr.); open gravelly soil, Batchawana village, August 14, No. 2063 (fr.).

**Crataegus macrantha** Lodd.

Gravelly soil, open, Batchawana village, August 14, No. 2055 (fr.); edge of balsam-birch woods, at beach, Pancake bay, July 16, Nos. 2056, 2057 (fr.); summit, elevation 1,900 feet, Mamainse mt., July 18, No. 2058 (lv.); Carp mt., Carp lake, August 2, No. 2059 (lv.).

**Rubus Idaeus** L., var. **strigosus** (Michx.) Maxim.—*R. Idaeus*, var. *aculeatissimus* Am. auth. in part. See Rhod. 21: 96 (1919).

Gravelly soil, Batchawana village, August 14, No. 2155 (fr.).

**Rubus Idaeus** L., var. **canadensis** Richards—*R. carolinianus*, Rydb., *R. subarcticus* (Greene) Rydb. See Rhod. 21: 97 (1919).

Roadside, maple association, Mamainse pt., July 23, No. 2156 (fr.); clearing, Batchawana is., September 9, No. 2154 (fr.).

**Rubus parviflorus** Nutt., var. **bifarius** Fern. See Rhod. 37: 280 (1935).

Edge of woods, Mamainse pt., July 13, No. 2157 (fl.).

**Rubus parviflorus** Nutt., var. **grandiflorus** Farwell. See Rhod. 37: 281 (1935).

Edge of woods, Gros Cap, July 11, No. 2158 (fl.); birch woods, Batchawana is., September 11, No. 2159 (fr.).



**Rubus pubescens** Raf.—*R. triflorus* Richards. See Rhod. 11: 236 (1909).

Low, sandy woods, Pancake pt., July 12, No. 2152 (fr.); birch woods, Batchawana is., September 11, No. 2153 (lv.).

**Rubus canadensis** L.

Cedar swamp, Pancake pt., August 22, No. 2161 (fr.); dry soil, rocky point, Smith lake, July 23, No. 2162 (fr.).

**Rubus hispidus** L.

Open hardwoods, Corbeil pt., July 15, No. 2148 (fl.); Xyris swamp, Pancake pt., August 21, No. 2149 (fl.); Xyris swamp, Pancake pt., August 16, Nos. 2150, 2151 (fr.).

**Fragaria virginiana** Duchesne.

Elderberry hill, Pancake bay, July 17, No. 2064 (fl.); mossy rocks, Mamainse pt., July 13, No. 2065 (fr.); dry, open woods, Mamainse pt., July 13, No. 2066 (fl., fr.); sand beach, Batchawana is., September 12, No. 2068 (fl.); gravelly soil, Batchawana village, August 14, No. 2069 (fr.); sandy beach, Batchawana is., September 13, No. 2070 (fl.).

**Fragaria vesca** L., var. *americana* Porter.

Rocky ground in a burn, Smith lake, July 23, No. 2067 (fr.); in open woods, Carp ridge, Carp lake, August 2, No. 2071 (fr.).

**Potentilla arguta** Pursh.

Talus slope, east ridge, Havilland bay, August 12, No. 2092 (fr.)

**Potentilla norvegica** L., var. *hirsuta* (Michx.) Lehm.—*P. monspeliensis* L. See Biblio. Bot. 16, heft 71: 404 (1908).

Beach, Pancake bay, July 16, No. 2099 (fl.); roadside, Mamainse pt., July 13, No. 2100 (fr.); roadway in loam, Mamainse pt., July 23, No. 2101 (fl.); talus slope, Carp lake, September 5, No. 2102 (fl., fr.); Mamainse pt., August 14, No. 2103 (fl., fr.); dry, gravelly soil, Batchawana village, August 14, No. 2104 (fl.); wet sand, Havilland bay, August 13, No. 2105 (fr.); thin soil in the open, east ridge, Havilland bay, August 12, No. 2106 (fr.); birch woods, Batchawana is., September 11, No. 2107 (fr.); rock ledges, Batchawana falls, August 29, No. 2108 (fr.).

**Potentilla palustris** (L.) Scop. See Rhod. 16: 5 (1914).

In 12 inches of water, Dumbell lake, Pancake pt., July 15, No. 2081 (fr.); sandy pool, Batchawana river, July 24, No. 2082 (fr.); swamp, Batchawana is., September 10, No. 2083 (fr.); in 12 inches of water, Cross lake (near Carp lake), July 25, No. 2085 (fl.).

**Potentilla palustris** (L.) Scop., f. *subsericea* (Becker) Wolf.

Beaver meadow, Carp lake, July 25, No. 2084 (fr.).

**Potentilla fruticosa** L.

In sphagnum and peat, Batchawana is., September 10, No. 2097 (fl.); swampy ground, Xyris swamp, Pancake bay, August 16, No. 2093 (fl.); rock crevices, Carp mt., August 2, No. 2094 (fl.); rock crevices on shore, Pancake pt., August 3, No. 2095 (fl.); swamp, Batchawana is., September 10, Nos. 2096, 2097 (fl.).

**Potentilla fruticosa** L., f. *villosissima* Fern. See Rhod. 37: 292 (1935).

Lava slope, Mamainse pt., July 13, No. 2098 (fl.).

**Potentilla tridentata** Ait.

Lava slope, Mamainse pt., July 13, No. 2088 (fl.); open, sandy woods, Pancake bay, July 12, No. 2089 (fl.); gravelly soil in the open, Batchawana village, August 14, No. 2090 (fr.); cliff top, Gros Cap, July 11, No. 2091 (fl.).

**Potentilla Anserina** (L.) Scop.

Gravel bars, Batchawana falls, August 27, No. 2440 (fl.); gravel bars, Batchawana falls, August 28, No. 2086 (lv.); shore by spring, Mamainse pt., July 13, No. 2087 (fl.).

**Geum macrophyllum** Willd.

Birch woods, Batchawana is., September 11, No. 2077 (lv.); old mine, Coppermine pt., August 2, No. 2078 (fr.); roadway, Mamainse pt., July 24, No. 2079 (fr.); clay roadway, Mamainse pt., July 24, No. 2080 (fr.).

**Geum aleppicum** Jacq., var. *strictum* (Ait.) Fern.—*G. strictum* Am. auth. See Rhod. 37: 294 (1935).

Carp lake, September 5, No. 2073 (fr.); roadway in burn under maple-yellow birch stand, Mamainse pt., July 23, No. 2074 (fr.); maple cut-over, Sault Ste. Marie, July 9, No. 2075 (fl.); open poplar association, Corbeil pt., August 5, No. 2076 (fr.).

**Geum rivale** L.

Damp hill-side under aspen, Sault Ste. Marie, July 10, No. 2072 (fr.).

**Agrimonia gryposepala** Wallr.

Deciduous woods, Harmony river, August 13, No. 2048 (fl.); wet ground at edge of woods, Mamainse road, July 22, No. 2050 (fl.); roadside, Mamainse road, August 2, No. 2051 (fl.); rock crevices, Harmony river, July 23, No. 2052 (fl.); black ash swamp, Sault Ste. Marie, July 9, No. 2053 (fl.); maple cut-over, Sault Ste. Marie, July 9, No. 2054 (fl.).

**Rosa acicularis** Lindl.

Gravelly soil, Batchawana village, August 14, Nos. 2127 (fr.); 2128 (fr.); rocky soil, Coppermine pt., August 20, No. 2129 (fr.); rocks, Mamainse pt., September 2, No. 2130 (fr.); grassy beach, Batchawana is., September 11, No. 2131 (fr.); thin soil, Pancake pt., August 3, No. 2132 (fr.); damp mixed woods, Corbeil pt., August 14, No. 2133 (fr.); gravelly soil, Batchawana village, August 14, Nos. 2134 (fr.), 2135 (fr.); on rocks, Mamainse pt., September 2, No. 2136 (fr.); thin soil on rocks, east ridge, Havilland bay, August 12, No. 2137 (fr.); edge of rocky woods, Mamainse pt., July 13, No. 2138 (fl.).

**Rosa blanda** Ait.

Batchawana village, August 14, No. 2146 (fr.); gravel beach, Batchawana falls, August 28, No. 2147 (fr.).

**Rosa palustris** Marsh.

Swampy ground, mouth of Batchawana river, July 31, No. 2139 (fl.); swampy ground, Batchawana river, September 12, No. 2144 (fr.); Carp lake, September 5, No. 2141 (fr.); carex swamp, Batchawana is., September 10, No. 2142 (fr.); bog at edge of Carp lake, July 25, No. 2143 (fl.); swamp, Batchawana is., September 10, No. 2145 (fr.).

**Prunus virginiana** L.

Summit, elevation 1,900 feet, Mamainse mt., July 18, No. 2113 (fr.); gravelly soil, Batchawana village, August 14, No. 2114 (fr.).

**Prunus pennsylvanica** L. f.

Summit, elevation 1,900 feet, Mamainse mt., July 18, No. 2110 (fr.); open clearings, Batchawana bay, July 22, No. 2111 (fr.); edge of mixed woods, Mamainse pt., July 13, No. 2112 (fr.).

**Prunus depressa** Pursh.—*P. pumila* Torr., not L. See Rhod. 25: 73 (1925).

Sandy beach, Pancake bay, August 30, No. 2115 (fr.); Batchawana river, August 30, No. 2116 (fr.); gravelly soil, Batchawana village, August 14, No. 2117 (fr.); sandy beach, Pancake bay, July 12, No. 2118 (fl., fr.).

## LEGUMINOSAE

**Medicago lupulina** L.

Moist roadside, Coppermine pt., August 20, No. 1807 (fr.).

**Trifolium pratense** L.

Sandy beach, Batchawana is., September 13, No. 1810 (fl., fr.).

**Trifolium repens** L.

Waste ground, Batchawana village, August 14, No. 1811 (fr.).

**Trifolium hybridum** L.

Camp clearing, Pancake bay, August 23, No. 1808 (fl.); open-grown poplar stand, Corbeil pt., July 29, No. 1809 (fl.).

**Vicia angustifolia** L.

Gravelly roadside, 1 mile west of Pancake river, August 22, No. 1813 (fr.).

**Vicia tetrasperma** (L.) Moench.

In sand at road camp, Pancake bay, August 14, No. 1814 (fr.); roadside, Mamainse pt., September 2, No. 1815 (fr.).

**Vicia americana** Muhl.

Roadside, Coppermine pt., August 20, No. 1812 (fr.).

**Lathyrus japonicus** Willd., var. **glaber** (Ser.) Fern.—*Pisum maritimum* L. for the most part; *L. maritimus*, var. *glaber* (Ser.) Eames. See Rhod. 34: 181 (1932).

Sand beach, Pancake bay, August 10, No. 1803 (fr.); sand beach, Havilland bay, August 13, No. 1502 (fr.); sand beach, Pancake bay, July 12, No. 1804 (fl.); sand beach, Batchawana is., September 12, No. 1805 (fl., fr.).

**Lathyrus ochroleucus** Hook.

Mixed woods, Mamainse harbour, September 2, No. 1806 (fr.).

## GERANIACEAE

**Geranium Bicknellii** Britton.

Roadside, Mamainse pt., September 2, No. 1315 (fr.); open field, Corbeil pt., July 23, No. 1316 (fr.); open rocks, east ridge, Havilland bay, August 12, No. 1317 (fr.); thin soil, open, east ridge, Havilland bay, August 12, No. 1318 (fr.); Coppermine pt., September 2, No. 1319 (fr.); roadside, Mamainse pt., September 2, No. 1320 (fr.); roadside gravel, Mamainse pt., July 13, No. 1321 (fl.); on top of cliff, Gros Cap, July 11, No. 2549 (fl., fr.).

## OXALIDACEAE

**Oxalis montana** Raf.—*O. americana* Bigelow, *O. acetosella* Am. auth., not L. See Rhod. 22: 143 (1920).

Damp soil under maples, Mamainse pt., July 23, No. 1964 (fr.); cedar swamp, Pancake bay, July 12, No. 1965 (fl.); hemlock woods, Batchawana is., September 9, No. 1966 (fr.).

## POLYGALACEAE

**Polygala paucifolia** Willd.

In shade of spruce, on beach southeast of Pancake river, July 17, No. 1979 (fr.); mixed woods, Mamainse pt., July 13, No. 1980 (fr.).

## CALLITRICHACEAE

**Callitriche palustris** L.

Muddy, shallow water, Carp river, July 29, No. 1277 (fr.); in mud, in 1 foot of water, Batchawana river, September 12, No. 1278 (fr.); quiet water in lagoon of river, Pancake bay, August 16, No. 1279 (fr.); shallow water, Batchawana falls, August 29, No. 1280 (lv.).

## ANACARDIACEAE

**Rhus glabra** L.

Thin soil among rocks, east ridge, Havilland bay, August 13, No. 916 (fr.).

**Rhus Toxicodendron** L.

Rock talus slope, Batchawana falls, August 29, No. 914 (fr.); gravelly soil, Batchawana is., August 14, No. 915 (fr.).

## AQUIFOLIACEAE

**Ilex verticillata** (L.) Gray.

Swamp, Batchawana is., September 10, No. 1343 (fr.); peaty soil, Hardpan swamp, Pancake bay, August 1, No. 1344 (fl.); cedar swamp, Mamainse pt., July 23, No. 1345 (fl.).

**Nemopanthus mucronata** (L.) Trel.

Black spruce-sphagnum bog, Corbeil pt., July 22, No. 1346 (fr.); crevices in lava, foot of Mamainse mt., July 18, No. 1347 (fr.); cedar-yellow birch association, Cedar lake (near Carp lake), July 25, No. 1348 (fr.).

## CELASTRACEAE

**Celastrus scandens** L.

Talus slope, Carp lake, August 2, No. 1238 (lv.); talus, Batchawana falls, August 3, No. 1239 (fr.); open talus slope, Carp lake, September 5, No. 1240 (fr.).

## ACERACEAE

**Acer pennsylvanicum** L.

Mixed deciduous woods, Batchawana is., September 10, No. 846 (fr.); mixed deciduous woods, Batchawana is., September 9, No. 847 (lv.); open poplar woods, on east ridge, Havilland bay, August 12, No. 848 (fr.); roadside in loam, under maple-yellow birch stand, Mamainse pt., July 23, No. 849 (lv.); ridge, thin soil, Fawn hill, Pancake river, July 31, No. 860 (fr.).

**Acer spicatum** Lam.

Mixed deciduous woods, Batchawana is., September 9, No. 857 (fr.); mixed woods, near mouth of Pancake river, September 4, No. 858 (fr.); sandy mixed woods, Pancake river, July 13, No. 859 (fl.); birch-balsam association, Pancake river, July 16, No. 861 (fr.); maple association, Mamainse pt., July 23, No. 862 (fr.).

**Acer saccharum** Marsh.

Mixed deciduous woods, Harmony river, August 13, No. 853 (fr.); river bank, Pancake river, July 31, No. 854 (fr.); poplar-birch slope, 1 mile east of Pancake camp, Corbeil pt., July 28, No. 855 (lv.); deciduous woods, Mamainse mt., July 23, No. 856 (lv.).

**Acer saccharum** var. **Rugelii** Rehder.

Hardwood bush, Batchawana is., September 10, Nos. 814, 816 (fr.).

**Acer rubrum** L.

Mixed deciduous woods, Batchawana is., September 9, No. 850 (fr.); cedar-yellow birch stand on hill-side, Mamainse mt., July 23, No. 851 (lv.); hardwoods opposite Sand pt., Batchawana is., September 15, No. 852 (lv.).

**Acer rubrum** var. **tridens** Wood.

Mixed hardwood scrub, elevation 1,900 feet, Mamainse mt., July 18, No. 815 (lv.).

## BALSAMINACEAE

**Impatiens biflora** Walt.

Damp ground, Pancake camp, July 21, No. 834a (fl.); low places, Corbeil pt., July 29, No. 834b (fl.); low ground, Mamainse harbour, September 2, No. 835 (fl.).

## RHAMNACEAE

**Rhamnus alnifolia** L'Her.

Swampy ground, Xyris swamp, Pancake pt., August 16, No. 2379 (fr.); low, open places, Stony pt., August 23, No. 2380 (fr.).



## VITACEAE

**Parthenocissus quinquefolia** (L.) Planch.—*Psedera quinquefolia* (L.) Greene.

Rock talus slope, Batchawana falls, August 29, No. 2426 (fr.); talus slope, old mine, Batchawana bay, August 2, No. 2427 (fr.).

## HYPERICACEAE

**Hypericum perforatum** L.

Fields, Batchawana bay, July 22, No. 1460 (fl.).

**Hypericum ellipticum** Hook.

Granite crevices, Batchawana falls, August 27, No. 1349 (fr.); damp ground in ditch, Batchawana bay, July 22, No. 1461 (fl.); sand-bar, Carp river, July 29, No. 1462 (fl.); shallow water in lagoon, Pancake bay, August 10, No. 1463 (fr.); beach, Pancake bay, July 16, No. 1464 (fl.); peaty soil, Hardpan swamp, Pancake bay, August 1, No. 1465 (fl.); beaver meadow, Cross lake (near Carp lake), July 25, No. 1466 (fl., fr.); low ground, Sawpit bay, August 21, No. 1467 (fr.).

**Hypericum boreale** (Britton) Bicknell.

Beaver meadow, Batchawana falls, August 27, No. 1468 (fr.); moist ground, Hardpan swamp, Pancake bay, August 1, No. 1469 (fl., fr.); sandy bank, Hardpan swamp, Pancake bay, August 1, No. 1470 (fl., fr.); wet sand, Havilland bay, August 13, No. 1471 (fl., fr.).

**Hypericum majus** (Gray) Britton.

Wet sand, Havilland bay, August 13, No. 1481 (fr.); low ground, Batchawana is., September 11, No. 1450 (fl., fr.); wet sand in lagoon, Pancake bay, August 10, No. 1482 (fr.).

**Hypericum canadense** L.

Damp bank, roadside, Batchawana bay, July 22, No. 1478 (fl.); open spots, Xyris swamp, Pancake pt., August 16, Nos. 1479, 1480 (fl., fr.); beaver meadow, Batchawana falls, August 27, No. 1410 (fl., fr.).

**Hypericum virginicum** L.

Alder swamp, Batchawana is., September 10, No. 1472 (fr.); low ground, Sawpit bay, August 21, No. 1473 (fr.); peaty soil, Hardpan swamp, Pancake bay, August 1, No. 1474 (fr.); beaver meadow, Carp lake, July 25, No. 1475 (fr.); granite crevices, Batchawana falls, August 27, No. 2456 (fr.); bog, Carp lake, July 24, No. 1476 (lv.); sandy bank, Carp river, July 29, No. 1477 (fl.).

## CISTACEAE

**Hudsonia tomentosa** Nutt.

In sand, Mamainse harbour, September 2, No. 1303 (fl.); sandy soil in open, Pancake bay, July 22, No. 1304 (fl.); sandy beach, Batchawana bay, July 24, No. 1305 (fl.); sandy beach, Pancake bay, July 12, No. 1306 (fl.); sand beach, Sand pt., September 12, No. 1307 (lv.).

## VIOLACEAE

***Viola cucullata* Ait.**

Crevices of rock, Batchawana falls, August 28, No. 2492 (fr.); in gravel, shallow water, Batchawana is., September 11, No. 2493 (fr.); creek valley, Batchawana river, August 28, No. 2494 (fr.); roadside sand, Mamainse pt., August 22, No. 2495 (fr.); roadside gravel, Mamainse road, August 22, No. 2496 (fl.); cedar swamp, Corbeil pt., August 22, No. 2497 (fr.); edge of spring, Mamainse pt., July 13, No. 2498 (fl.); alder association, Pancake pt., July 17, No. 2499 (fl.); sand-bar, mouth of Carp river, July 29, No. 2500 (fr.); summit, elevation 1,900 feet, Mamainse mt., August 15, No. 2501 (lv.); deep bank, beaver meadow, Pancake pt., August 1, No. 2502 (fr.); damp maple woods, Mamainse mt., July 23, No. 2503 (lv.); wet turf, beach, Corbeil pt., August 1, No. 2504 (fr.).

***Viola septentrionalis* Greene.**

Beach, Batchawana is., September 13, No. 2490 (lv.); in sand between boulders, Batchawana falls, August 28, No. 2491 (fr.).

***Viola Selkirkii* Pursh.**

Mountain slope, Carp lake, August 2, No. 2489 (fr.).

***Viola lanceolata* L.**

Low places in sand, Sand pt., September 12, No. 2338 (fr.); damp ground on shore of island, Smith lake, July 18, No. 2505 (fl.).

***Viola pallens* (Banks) Brain.**

Beside spring, Mamainse pt., July 13, No. 2480 (fl.); peaty soil, beaver meadow, Pancake pt., August 1, Nos. 2481, 2485 (fr.); in sand between boulders, Batchawana falls, August 28, Nos. 2482, 2486 (fr.); in sphagnum and peat, Batchawana is., September 10, No. 2483 (fr.); sand bank, Harmony river, September 18, No. 2484 (fr.); beaver meadow, Batchawana falls, August 29, No. 2487 (fr.); moist soil, beaver meadow, Pancake pt., July 17, No. 2488 (fr.).

***Viola renifolia* Gray, var. *Brainerdii* (Greene) Fern. See Rhod. 14: 86 (1912).**

Tolerant hardwoods, Harmony river, August 13, No. 2510 (fr.); open-grown poplar association, Corbeil pt., August 5, No. 2511 (fr.); moist mixed woods, Pancake river, July 16, No. 2512 (fr.); sandy bank, Hardpan swamp, Pancake bay, August 1, No. 2513 (fr.); humus on rocks, Coppermine pt., August 20, Nos. 2550, 2519 (fr.); mixed woods, Harmony river, September 3, No. 2515 (fr.); damp woods, Batchawana falls, August 27, No. 2516 (fr.); hardwood ridge, Batchawana falls, August 28, No. 2517 (fr.); maple woods, Mamainse mt., August 15, No. 2518.

***Viola pubescens* Ait., var. *Peckii* House.**

Moist gully, deciduous woods, Batchawana river, August 29, No. 2477 (fr.); poplar-birch slope, Corbeil pt., July 28, No. 2478 (fr.); damp soil, deciduous woods, Mamainse pt., July 23, No. 2479 (fr.).

**Viola adunca** J. E. Smith.—*V. arenaria* Am. auth., not DC. See Rhod. 15: 106 (1913).

Lava crevices, Mamainse harbour, September 2, No. 2506 (fl.); lava crevices, Mamainse pt., September 2, No. 2507 (fr.); rock crevices, Pancake pt., August 3, No. 2508 (lv.); rocky shore, Mamainse pt., September 2, No. 2503 (fr.).

#### THYMELAEACEAE

**Dirca palustris** L.

Mixed woods, Carp lake, September 5, No. 2443 (lv.); loam roadway, Mamainse pt., July 23, No. 2476 (lv.).

#### ELAEAGNACEAE

**Shepherdia canadensis** (L.) Nutt.

Edge of woods by shore, Mamainse pt., July 13, No. 1224 (fr.).

#### ONAGRACEAE

**Epilobium angustifolium** L.

Dry soil, rocky ground, Mamainse pt., July 23, No. 1872 (fl.).

**Epilobium densum** Raf.

Low places, Chapman's field, Corbeil pt., August 23, No. 1888 (fl., fr.); swampy ground, Xyris swamp, Pancake pt., August 16, No. 1889 (fl., fr.); Chapman's field, Corbeil pt., August 23, No. 1890 (fr.); cedar swamp, Batchawana falls, September 9, No. 1891 (fl., fr.); beaver meadow, Batchawana falls, August 30, No. 1892 (fr.); low places in fields, Stony pt., August 23, No. 1893 (fr.); beaver meadow, Corbeil pt., August 5, No. 1894 (fl., fr.); roadside ditch, Pancake pt., July 31, No. 1895 (fl., fr.).

**Epilobium glandulosum** Lehm., var. **adenocaulon** (Haussk.) Fern.—*E. adenocaulon* Haussk. See Rhod. 20: 35 (1918).

Moist hollow, Mamainse mt., August 15, No. 1873 (fl.); thin soil, Coppermine pt., August 20, No. 1874 (fr.); low places, Chapman's field, August 23, No. 1875 (fl.); wagon road, Batchawana is., September 11, No. 1876 (fr.); clearing, low ground, Batchawana is., September 11, No. 1877 (fr.); camp clearing, Pancake river, August 10, No. 1878 (fl.); wet sand, Mamainse road, August 2, No. 1879 (fl.); alder-carex association, Pancake pt., July 26, No. 1880 (fl.).

**Epilobium glandulosum** Lehm., var. **occidentale** (Trel.) Fern. See Rhod. 20: 35 (1918).

Low places, Chapman's field, Corbeil pt., August 23, No. 1881 (fr.); swampy places, Batchawana village, August 14, No. 1882 (fr.); damp sand, Sawpit bay, August 19, No. 1883 (fr.); sandy soil in the open, Sawpit bay, August 21, No. 1884 (fr.); moist soil, Dumbell lake, Pancake pt., July 17, No. 1885 (fl., fr.); roadside ditch, Mamainse pt., July 13, No. 1886 (fl., fr.); rocky, burned soil, Mamainse pt., July 23, No. 1887 (fl., fr.).

**Oenothera muricata** L.

Sand beach, Havilland bay, August 13, No. 2528 (fl., fr.).

**Oenothera muricata** L., var. **canescens** (T. and G.) Robinson.

Sand beach, Batchawana is., September 12, No. 2525 (fr.); open fields, Stony pt., August 23, No. 2526 (fr.); gravelly field, Batchawana village, August 14, No. 2527 (fl., fr.); dry roadside, Mamainse pt., July 13, No. 2529 (fl.).

**Oenothera perennis** L.—*O. pumila* L. See Rhod. 25: 47 (1923).

Sandy soil in the open, Sawpit bay, August 21, No. 1896 (fr.); low places, fields, Stony pt., August 23, No. 1897 (fl.).

**Circaea alpina** L.

Damp humus soil in ravine, Coppermine pt., September 2, No. 2412 (fr.); alder swamp, Batchawana is., September 9, No. 1866 (fr.); damp woods, east ridge, Havilland bay, August 13, No. 1867 (fr.); gravel near road, Mamainse pt., July 13, No. 1868 (fl.); low ground in cedar swamp, Pancake pt., July 13, No. 1869 (fl.); damp clay soil, maple woods, Mamainse pt., July 23, No. 1870 (fl.); wet soil, maple woods, Mamainse pt., July 23, No. 1871 (fr.).

#### HALORAGIDACEAE

**Myriophyllum** sp.

Shallow water, in sand-bottomed pool, mouth of Black creek, July 24, No. 2551 (lv.); in shallow water, Batchawana river, July 31, No. 2552 (lv.).

As the specimens are all sterile no attempt has been made at this time to make specific determinations.

**Hippuris vulgaris** L.

Wet places in beaver meadow, emersed, Pancake pt., August 1, No. 1456 (fr.); wet places in beaver meadow, Pancake pt., July 23, No. 1457 (fr.); shallow water, Carp river, July 24, No. 1458 (fr.); shallow water, beaver meadow, Batchawana falls, August 27, No. 1459 (fr.).

#### ARALIACEAE

**Aralia racemosa** L.

Hardwoods, Carp lake, September 5, No. 831 (fr.); poplar-birch slope, Corbeil pt., July 28, No. 832 (fl.); damp hardwoods, Carp lake, August 2, No. 833 (fl.).

**Aralia hispida** Vent.

Roadside, Sawpit bay, August 21, No. 2457 (lv.); birch burn, Coppermine pt., September 2, No. 824 (fr.); rocky hemlock slope, Havilland bay, August 13, No. 825 (fr.); mixed deciduous woods, Pancake bay, July 17, No. 826 (fr.); damp woods, Dumbell lake, July 15, No. 827 (fr.); sandy bank, Harmony river, September 16, No. 1238 (fr.).

**Aralia nudicaulis** L.

Maple-yellow birch stand, Carp lake, July 25, No. 828 (fr.); cedar-yellow birch association, Carp lake, July 25, No. 829 (fr.); balsam-birch-soft maple association, Pancake bay, August 10, No. 830 (fr.).

## UMBELLIFERAE

**Hydrocotyle americana** L.

Damp ground, at falls, Carp river, September 7, No. 2389 (fr.); beaver meadow, Batchawana falls, August 29, No. 2390 (fr.); sphagnum, Island lake, August 22, No. 2391 (fr.); damp ground, Carp river, July 24, No. 2392 (lv.).

**Sanicula marilandica** L.

Sandy woods, Batchawana falls, August 28, No. 2399 (fr.); Batchawana falls, August 27, No. 2400 (fr.); Pancake tote road, Pancake pt., September 5, No. 2401 (fr.); maple cut-over, Sault Ste. Marie, July 9, No. 2402 (fl., fr.); ridge above Carp lake, August 2, No. 2403 (fr.).

**Osmorhiza Claytonii** (Michx.) Clarke.

Edge of damp woods, Mamainse road, July 22, No. 2381 (fr.); damp ground by stream, Gimlet Creek trail, July 12, No. 2382 (fr.); damp woods, east ridge, Havilland bay, August 13, No. 2383 (fr.); Batchawana village, August 14, No. 2384 (fr.); thin soil, open, east ridge, Havilland bay, August 13, No. 2385 (fr.).

**Osmorhiza obtusa** (Coult. and Rose) Fern.

Cedar swamp, Gimlet Creek trail, Pancake river, July 12, No. 2386 (fr.); damp ground, Mamainse pt., July 13, No. 2387 (fr.); Mamainse pt., September 2, No. 2388 (fr.).

**Cicuta bulbifera** L.

Carex swamp, Batchawana is., September 10, No. 2396 (fr.); swampy ground, Batchawana river, September 12, No. 2397 (fr.).

**Sium suave** Walt.—*S. cicutaefolium* Gmel. of auth.—See Rhod. 17: 131 (1915).

Gravel bank, Batchawana river, August 27, No. 2393 (fr.); wet, peaty soil, Hardpan swamp, Pancake bay, August 1, No. 2394 (fl.); cedar swamp, Mamainse road, July 23, No. 2395 (fl.).

**Heracleum lanatum** Michx.

River bank, Gimlet Creek trail, Pancake bay, July 30, No. 2404 (fr.).

## CORNACEAE

**Cornus canadensis** L.

Cedar-yellow birch association, Carp lake, July 25, No. 1281 (fr.); sandy woods, Pancake bay, July 12, No. 1282 (fl.); cedar swamp, Pancake pt., August 22, No. 1283 (fr.); balsam-birch woods, Coppermine pt., September 2, No. 1284 (fr.); mixed hardwoods, Batchawana is., September 9, No. 1285 (fr.); sandy woods, Pancake pt., July 12, No. 1286 (fl.); in hardwood bush, Batchawana is., September 9, No. 2534 (fr.); in hardwood bush, Batchawana is., September 12, No. 1019 (fl.); sandy woods, Pancake bay, September 7, No. 1017 (fl.); sandy woods, Pancake bay, July 12, No. 1020 (fl.).

The three last numbers are extremes that might be included in the dubious variety *intermedia* Farr.



**Cornus rugosa** Lam.—*C. circinata* L'Her.—See Rhod. 12: 122 (1910).

Open, rocky woods, Mamainse harbour, September 2, No. 1293 (lv.); rock talus, Carp lake, September 5, No. 1294 (lv.); open, poplar woods, east ridge, Havilland bay, August 12, No. 1295 (fr.).

**Cornus stolonifera** Michx.

Gravelly soil, Batchawana village, August 14, No. 1297 (fr.); open woods, Mamainse pt., July 13, No. 1298 (fl.); shores, Batchawana is., September 12, No. 1299 (fr.); edge of stream, Mamainse pt., July 13, No. 1300 (fr.); gravel beach, Batchawana falls, August 28, No. 1301 (fl.); edge of creek, Mamainse pt., September 2, No. 1302 (lv.); alder swamp, Mamainse road, Mamainse pt., July 25, No. 2444 (fl.).

**Cornus alternifolia** L. f.

Edge of woods, Mamainse road, Mamainse pt., July 22, No. 1287 (lv.); Batchawana falls, August 27, No. 1288 (fr.); rock talus slope, Batchawana falls, August 29, No. 1289 (fr.); Pancake river, September 4, No. 1290 (fr.); wet hollow, deciduous woods, Mamainse pt., July 23, No. 1291 (lv.); in alders by creek, Pancake pt., July 17, No. 1292 (lv.); mixed deciduous woods, Pancake road, August 15, No. 1296 (lv.).

#### ERICACEAE

**Chimaphila umbellata** (L.) Bart., var. **cisatlantica** Blake. See Rhod. 19: 241 (1917).

Carp river, September 6, No. 1414 (fr.); sandy woods, Sand pt., September 12, No. 1415 (fr.); thin soil under pines, Fawn hill, Pancake bay, July 31, No. 1416 (fr.); sand beach, Pancake bay, August 22, No. 1417 (fr.).

**Pyrola asarifolia** Michx.

Birch woods, Batchawana is., September 11, No. 1400 (fr.); mixed woods, Batchawana falls, August 28, No. 1399 (fr.); damp mixed woods, Batchawana falls, August 27, No. 2452 (fr.).

**Pyrola chlorantha** Sw.

Open poplar woods, east ridge, Havilland bay, Aug. 12, No. 1384 (fr.); coniferous woods, Mamainse pt., September 2, No. 1386 (fr.); coniferous woods, Coppermine pt., August 20, No. 1387 (fr.).

**Pyrola chlorantha** Sw., var. **paucifolia** Fern. See Rhod. 22: 51 (1920).

Damp woods, east ridge, Havilland bay, August 13, No. 1385 (fr.).

**Pyrola elliptica** Nutt.

Carp river, September 6, No. 2453 (fr.); damp coniferous woods, Sawpit bay, August 21, No. 1401 (fr.); birch woods, Batchawana is., September 11, No. 1402 (fr.); damp woods, Batchawana is., September 9, No. 1403 (fr.); damp woods, Batchawana is., September 10, No. 1404 (fr.); mixed deciduous woods, Batchawana falls, August 29, No. 1405 (fr.); Batchawana river, August 27, No. 1406 (fr.); mixed deciduous woods, Mamainse road, July 18, No. 1407 (fl.); maple-yellow birch association, Corbeil pt., August 2, No. 1408 (fr.); maple-yellow birch association, Mamainse pt., July 23, No. 1409 (fr.).

**Pyrola rotundifolia** L., var. **americana** (Sweet) Fern.—*P. americana* Sweet. See Rhod. 22: 122 (1920).

Hummocks, swampy ground, Xyris swamp, Pancake bay, August 5, No. 1390 (fl.); Xyris swamp, Dumbell lake, Pancake pt., August 16, No. 1388 (fl., fr.); black spruce-carex swamp, Corbeil pt., July 24, No. 1389 (fl.).

**Pyrola secunda** L.

Coniferous woods, Mamainse pt., July 13, No. 1391 (fl.); spruce-sphagnum swamp, Batchawana is., September 11, No. 1392 (fr.); coniferous woods, Mamainse pt., July 13, No. 1393 (fl.); damp coniferous woods, Sawpit bay, August 21, No. 1394 (fr.); Batchawana is., August 27, No. 1395 (fr.); coniferous woods, Carp river, September 6, No. 1396 (fr.); cedar swamp, Elderberry hill, Pancake bay, July 17, No. 1397 (fl.); cedar-yellow birch association, Pancake bay, July 25, No. 1398 (fr.).

**Moneses uniflora** (L.) Gray.

Cedar swamp, Elderberry hill, Pancake bay, July 17, No. 1420 (fl.); cedar swamp, Corbeil pt., July 28, No. 1421 (fl.); damp coniferous woods, Sawpit bay, August 21, No. 1422 (fr.).

**Monotropa uniflora** L.

Deciduous woods, Batchawana falls, August 29, No. 1373 (fl.); open-grown poplar-birch slope, Corbeil pt., July 28, No. 1374 (fl.); deciduous woods, Batchawana is., September 12, No. 1375 (fl.); black spruce-sphagnum bog, Corbeil pt., July 22, No. 1376 (fl.); deciduous woods, Batchawana is., September 9, No. 1377 (fl.); black spruce-sphagnum bog, Batchawana is., September 11, No. 1378 (fl.); open poplar woods, east ridge, Havilland bay, August 12, No. 1379.

**Monotropa Hypopitys** L.

Coniferous woods, Mamainse pt., September 2, No. 1372 (fr.).

**Ledum groenlandicum** Oeder.

Black spruce bog, Corbeil pt., July 15, No. 1370 (fl.); sphagnum bog, Dumbell lake, Pancake pt., July 13, No. 1371 (fr.).

**Kalmia polifolia** Wang.

Xyris swamp, Corbeil pt., August 16, Nos. 1366, 1367 (fr.); black spruce-cedar-carex swamp, Corbeil pt., July 24, No. 1368 (fr.); sphagnum bog, Dumbell lake, July 15, No. 1369 (fr.).

**Andromeda glaucophylla** Link.

Peaty soil, Hardpan swamp, Pancake bay, August 1, No. 1410 (fr.); sphagnum bog, Dumbell lake, Pancake pt., July 15, No. 1411 (fr.); Xyris swamp, Pancake pt., August 16, No. 1412 (fl.).

**Chamaedaphne calyculata** (L.) Moench.

Carp lake, July 25, No. 1413 (fr.).

**Gaultheria procumbens** L.

Sawpit bay, August 21, No. 2450 (fl.); spruce-tamarack stand, Corbeil pt., August 8, No. 1381 (fl.); thin soil on rocks, east ridge, Havilland bay, August 12, No. 1380 (fl.).

**Arctostaphylos Uva-ursi** (L.) Spreng.

Pinus-vaccinium association, Pancake bay, July 16, No. 1362 (fr.); thin soil on lava rocks, Mamainse pt., September 2, No. 1363 (fr.); thin soil on rocky shore, Pancake pt., August 3, No. 1364 (fr.).

**Arctostaphylos Uva-ursi** (L.) Spreng., var. **coactilis** Fern. and MacBride. See Rhod. 16: 212 (1914).

On bare rocks under pine, granite hill-side, Harmony river, August 13, No. 1365 (fr.).

**Epigaea repens** L.

Sandy soil, oak-red pine woods, Sand pt., September 12, No. 1418 (fr.); lava crevices, island in Smith lake, Mamainse pt., July 15, No. 1419 (fr.).

**Chiogenes hispidula** (L.) T. and G.

Sphagnum bog, Dumbell lake, Pancake pt., July 15, No. 1383 (fr.); black spruce bog, Corbeil pt., August 8, No. 1382 (fr.).

**Vaccinium pennsylvanicum** Lam.

Sand beach, Sand pt., September 12, No. 1440 (lv.); thin soil in open, east ridge, Havilland bay, August 12, No. 1441 (fr.); sphagnum hummocks, Xyris swamp, Pancake bay, August 5, No. 1442 (fr.); sandy beach, Pancake bay, July 22, No. 1443 (fr.); sphagnum bog, Dumbell lake, July 15, Nos. 1444, 1448 (fr.); granite crevices, Batchawana falls, August 28, No. 1445 (fr.); spruce-tamarack stand, Corbeil pt., August 8, No. 1446 (lv.); open woods, Mamainse pt., July 13, No. 1447 (fr.); crevices in lava, island in Smith lake, Mamainse pt., July 16, No. 1449 (fr.); beach, Batchawana is., September 13, No. 1450 (lv.).

**Vaccinium pennsylvanicum** Lam., var. **nigrum** Wood.

Thin soil, east ridge, Havilland bay, August 12, Nos. 1451, 2451 (fr.).

**Vaccinium canadense** Kalm.

Beach, Batchawana is., September 13, No. 1423 (lv.); sphagnum bog, Dumbell lake, Pancake pt., July 15, No. 1424 (fr.); beach, Pancake camp, Pancake bay, September 4, No. 1425 (fr.); hill-top, elevation 1,900 feet, Mamainse mt., July 18, No. 1426 (fr.); thin soil on lava, Mamainse pt., September 2, No. 1427 (fr.); sphagnum-black spruce association, Carp ridge, Carp lake, July 19, No. 1428 (fr.).

**Vaccinium corymbosum** L.

Open-grown poplar, Corbeil pt., July 31, Nos. 1429, 1430 (fr.).

**Vaccinium ovalifolium** Sm.

Woods, Carp river, September 6, No. 1433 (fr.); woods, Smith Lake trail, Mamainse pt., July 18, No. 1434 (fr.); crevice in lava, Mamainse pt., July 18, No. 1435 (fr.); mixed woods, Batchawana falls, August 27, No. 1436 (lv.).

**Vaccinium Oxycoccus** L.

Xyris swamp, Pancake pt., August 11, *No. 1437* (fr.); sphagnum bog, Dumbell lake, Pancake pt., July 15, *No. 1439* (fr.).

**Vaccinium macrocarpon** Ait.

On floating log, with myrica, Carp lake, July 25, *No. 1431* (fl., fr.); swamp, Island lake, August 22, *No. 1432* (fr.); Xyris swamp, Pancake pt., August 21, *No. 1438* (fr.).

## PRIMULACEAE

**Primula intercedens** Fern.—*P. farinosa* Am. auth., not L. See Rhod. **30**: 86 (1928).

Lava crevices, Mamainse pt., July 13, *Nos. 2375* (fl.), *2376* (fl.); wet sand between stones, shore of Corbeil pt., July 29, *No. 2377* (fl.); rocky shores, Pancake bay, July 16, *No. 2378* (fl.).

**Lysimachia terrestris** (L.) BSP.

Swamp, Batchawana is., September 10, *No. 2371* (fl.); beaver meadow, Betchawana river, August 27, *No. 2372* (fr.); swampy ground, Carp lake, July 25, *No. 2373* (fl.); wet bank, Pancake bay, July 23, *No. 2374* (fl.).

**Trientalis borealis** Raf.—*T. americana* (Pers.) Pursh. See Rhod. **11**: 236 (1909).

Sandy woods, Pancake camp, July 12, *No. 2369* (lv.); maple association, Mamainse pt., July 23, *No. 2370* (lv.)

## OLEACEAE

**Fraxinus americana** L.

Talus slope, ridge above Carp lake, September 5, *No. 1898* (lv.).

**Fraxinus pennsylvanica** Marsh.

Beach, Havilland bay, August 13, *No. 1900* (fr.); Batchawana is., September 9, *No. 1901* (fr.); mixed hardwoods on ridge, Carp lake, September 5, *No. 2532* (fasciated infl.).

**Fraxinus pennsylvanica** Marsh., var. *lanceolata* (Borkh.) Sarg.

Ridge above Carp lake, September 6, *No. 1899* (fr.).

**Fraxinus nigra** Marsh.

Camp clearing, Batchawana river, August 28, *No. 1902* (lv.); Batchawana is., September 9, *No. 1903* (fr.); bank of stream, Pancake river, September 4, *No. 1904* (fr.); beaver meadow, Cross lake (near Carp lake), July 25, *No. 1905* (lv.).

## GENTIANACEAE

**Gentiana linearis** Fröl.

Batchawana falls, August 27, *No. 1334* (fl.); damp clay bank, Batchawana falls, August 26, *No. 1335* (fl.); beaver meadow, Batchawana river, August 27, *No. 1336* (fl.).

**Gentiana rubricaulis** Schwein.—*G. linearis*, var. *latifolia* Gray.—*Dasystephana Grayi* (Kusnezow) Britton. See Rhod. **37**: 325 (1935).

Low, sandy places, Sand pt., September 12, *No. 1265* (fl.); low, open, mixed woods, Mamainse harbour, September 2, *No. 1333* (fl.).

***Helenia deflexa* (Sm.) Griseb.**

Roadside, Pancake tote road, Pancake pt., September 5, No. 1325 (fl.); sandy woods, Batchawana falls, August 28, No. 1326 (fl.); creek banks, Batchawana falls, August 28, No. 1327 (fr.); roadside, Havilland bay, August 12, No. 1328 (fr.); cedar swamp, Pancake bay, July 12, No. 1329 (fr.); mixed woods at foot of east ridge, Havilland bay, August 13, No. 1330 (immature fr.); damp rock crevices, Smith lake, July 23, No. 1331 (immature fr.); roadside, Mamainse road, July 18, No. 1332 (fl.).

***Menyanthes trifoliata* L., var. *minor* Michx. See Rhod. 31: 195 (1929).**

Carex swamp, Batchawana is., September 10, No. 1322 (lv.); muddy ground in sphagnum bog, beaver meadow, Pancake bay, July 23, No. 1323 (fr.); swamp, Batchawana is., September 10, No. 1324 (fr.).

## APOCYNACEAE

***Apocynum androsaemifolium* L.**

Beach, Pancake bay, July 16, No. 1350 (fl.); gravelly soil, Batchawana village, August 14, No. 1351 (fl.).

## BORAGINACEAE

***Cynoglossum officinale* L.**

Rocky clearing, Coppermine pt., August 20, Nos. 1215 (fr.), 1216 (fr.).

***Cynoglossum boreale* Fern.**

Lava talus, Mamainse harbour, September 2, No. 1213 (fr.); clearing, Coppermine pt., September 2, No. 1214 (fr.).

***Lappula echinata* Gilib.**

Batchawana village, August 14, No. 1217 (fr.); dry sand by roadside, Pancake bay, July 23, No. 1218 (fl., fr.); sandy ground at camp, Pancake bay, August 17, No. 1219 (fr.); roadside, Mamainse pt., July 13, No. 1220 (fl., fr.).

***Hackelia deflexa* (Willd.) Opiz., var. *americana* (Gray) Fern. and Johnston.—*Lappula deflexa*, var. *americana* (Gray) Greene. See Rhod. 26: 124 (1924).**

Rocky talus, Batchawana falls, August 29, No. 1221 (fr.).

***Mertensia paniculata* (Ait.) Don.**

Damp clay by stream, Gimlet Creek trail, Pancake bay, July 12, No. 1222 (fl.); clay soil, Pancake bay, July 13, No. 1223 (white-flowered form).

***Myosotis arvensis* (L.) Hill.**

Open maple woods, Sault Ste. Marie, July 9, No. 2469 (fl.).

## LABIATAE

***Scutellaria lateriflora* L.**

Damp sand, Batchawana river, July 31, No. 2467 (fl.); shores, Batchawana is., September 12, No. 2465 (fl.); damp bank, Carp lake, August 1, No. 2464 (fl.); moist loam, Mamainse tote road, August 2, No. 1862 (fl.);



damp ground, edge of woods, Batchawana bay, July 22, No. 1863 (fl.); cedar-spruce association, Pancake pt., August 7, No. 1864 (fl.); granite crevices, Batchawana falls, August 27, No. 1865 (fr.).

**Scutellaria epilobiifolia** Hamilton.—*S. galericulata* Am. auth., not L. See Rhod. 23: 85 (1921).

Wet ground, Smith lake, Mamainse mt., July 23, No. 1858 (fl.); stream edge, deciduous woods, Corbeil pt., July 15, No. 1859 (fl.); open low places, in woods, Pancake bay, July 12, No. 1860 (fl.); roadside at camp, Pancake bay, July 12, No. 1861 (fl.).

**Agastache Foeniculum** (Pursh) Ktze.

Field, Stony pt., August 23, No. 1816 (fl.); sandy places at mouth of river, Carp river, August 15, No. 1817 (fl.).

**Dracocephalum parviflorum** Nutt.

Meadow, Mamainse pt., September 2, No. 1818 (fr.); rocky soil, Coppermine pt., August 20, No. 1819 (fr.).

**Nepeta Cataria** L.

Clearing, Coppermine pt., August 20, No. 1842 (fl.).

**Nepeta hederacea** (L.) Trev.

Clearing, Coppermine pt., August 20, No. 1843 (lv.).

**Prunella vulgaris** L., var. *lanceolata* (Bart.) Fern. See Rhod. 15: 183 (1913).

Mamainse pt., July 23, No. 2466 (fl.); clearing, Batchawana is., September 11, No. 1844 (fr.); sand-bar, Batchawana falls, August 27, No. 1845 (fr.); damp soil, Mamainse tote road, August 2, Nos. 1846, 1847 (fl.); wet turf on shore, Corbeil pt., August 1, No. 1848 (fl.).

No. 1848 is f. *iodocalyx* Fern, and No. 1847 is f. *candida* Fern.

**Galeopsis Tetrahit** L.

Roadside, Pancake bay, August 22, No. 1820 (fr.).

**Galeopsis Tetrahit** L., var. *bifida* (Boenn.) Lej. and Court. See Rhod. 12: 141 (1910).

Birch woods, Batchawana is., September 11, No. 1821 (fl.); roadside, Batchawana bay, July 22, No. 1822 (fl.); tote road, Pancake river, July 17, No. 1823 (fl.); Chapman's field, Corbeil pt., July 29, No. 1824 (fl.); damp sand, Havilland bay, August 13, No. 1825 (fl.); Batchawana village, August 14, No. 1826 (fl., fr.).

**Satureja vulgaris** L.

Roadside, maple cut-over, Sault Ste. Marie, July 9, No. 1849 (fr.); Batchawana village, August 14, No. 1850 (fr.); thin soil, Elderberry hill, Pancake bay, July 17, No. 1851 (fr.); thin soil in open, east ridge, Havilland bay, August 12, No. 1852 (fl., fr.); shores opposite Sand pt., Batchawana is., September 12, No. 1853 (fr.); gravelly soil, Batchawana village, August 14, No. 1854 (fr.); shores, Batchawana is., September 12, No. 1855 (fr.); clearing, Batchawana is., September 10, No. 1856 (fl.); talus, Carp ridge, Carp lake, September 5, No. 1857 (fr.).

***Lycopus uniflorus* Michx.**

Wet sand at beach, Pancake bay, July 16, No. 1832 (fl.); damp sand, in beaver meadow, Pancake bay, July 23, No. 1833 (fl.); damp soil on rocks, Smith lake, July 23, No. 1834 (fl.); swamp, Batchawana is., September 10, No. 1835 (fr.).

***Lycopus americanus* Muhl.**

Batchawana is., September 10, No. 1827 (fl.); Xyris swamp, Pancake bay, August 21, No. 1828 (fl.); damp ground, Mamainse tote road, July 22, No. 1829 (fl.); sand by river at falls, Carp river, September 7, No. 1830 (fr.); damp soil, Smith lake, July 23, No. 1831 (fl.).

***Mentha arvensis* L., var. *canadensis* (L.) Briquet.**

Beaver meadow, Dumbell lake, Pancake pt., July 17, No. 1836 (fl.); wet muck, Cross lake (near Carp lake), July 25, No. 1837 (fl.); wet places, beaver meadow, Pancake bay, August 1, No. 1838 (fl.); beaver meadow, Batchawana falls, August 27, No. 1839 (fl.); beaver meadow, Batchawana falls, August 29, No. 1840 (fl.); Batchawana is., September 10, No. 1841 (fl.).

SCROPHULARIACEAE<sup>1</sup>***Verbascus Thapsus* L.**

Fields, Batchawana village, August 14, No. 2326 (fl.); gravelly soil, Batchawana village, August 14, No. 2327 (fl., fr.).

***Scrophularia lanceolata* Pursh.**

Field, Stony pt., August 23, No. 2321 (fr.); woods on shore, Batchawana is., September 13, No. 2322 (fr.).

***Chelone glabra* L.**

Alder creek, Pancake bay, September 7, No. 2316 (fl.); river bank, Havilland bay, August 13, No. 2317 (fl.); shores, Batchawana is., September 12, No. 2318 (fl.); moist roadside, Corbeil pt., August 7, No. 2319 (fl.); roadside, Pancake camp, September 4, No. 2320 (fl.).

***Mimulus ringens* L.**

Marshy meadow, Batchawana river (falls), August 29, No. 2313; Pancake river, September 4, No. 2314 (fl.); beaver meadow, Batchawana river (above first falls), August 8, No. 2315 (fr.).

***Veronica americana* (Raf.) Schwein.**

Wet ground, Mamainse pt., July 22, No. 2330 (fl.); Pancake river, September 4, No. 2331; wet ground under cedars, Pancake pt., July 17, No. 2329 (fl.).

***Veronica scutellata* L.**

Cedar swamp, Gimlet creek, Pancake bay, July 12, No. 2332 (fl.); damp, peaty soil, Hardpan swamp, Pancake bay, August 1, No. 2333 (fl.).

<sup>1</sup>As the determinations of the specimens in this family have been kindly checked by Dr. F. W. Pennell his nomenclature has been employed as it appears in his monograph on "The Scrophulariaceae of Eastern North America" (Monogr. 1, Phil. Acad. Nat. Sci. 1935).

**Veronica serpyllifolia** L.

Damp soil, Mamainse rd., July 15, No. 2334 (fr.); roadside, Batchawana village, August 14, No. 2335 (fr.); damp soil, roadside, Coppermine pt., August 20, No. 2336 (fr.).

**Veronica arvensis** L.

Clearing, Coppermine pt., August 20, No. 2328 (fr.).

**Melampyrum lineare** Desr.

Sandy woods, Pancake bay, July 12, No. 2324 (fl.); sandy beach, Batchawana bay, July 24, No. 2325 (fl.).

**Melampyrum lineare latifolium** (Muhl.) Beau.

Open, rocky soil, Havilland bay, August 12, No. 2323 (fl.).

## OROBANCHACEAE

**Conopholis americana** (L. f.) Wallr.

Red oak woods, on ridge above Carp lake, August 2, No. 1963 (fr.).

## LENTIBULARIACEAE

**Pinguicula vulgaris** L.

Damp lava crevices, Mamainse harbour, September 2, No. 1792 (fl.); lava crevices, Mamainse pt., July 13, No. 1606 (fl., fr.).

**Utricularia vulgaris** L., var. **americana** Gray.

Stagnant pool, Harmony river, July 24, No. 1794 (fl.).

**Utricularia minor** L.

Swampy pools, Xyris swamp, Pancake pt., August 5, No. 1795 (fl.).

**Utricularia intermedia** Hayne.

Stagnant pool, Black creek, Batchawana bay, July 24, No. 1801 (lv.); shallow water, Havilland bay, August 13, No. 1802 (fl.); swampy pools, Xyris swamp, Pancake bay, August 5, No. 1799 (fl.); lagoon of Pancake river, Pancake bay, August 10, No. 1800 (lv.).

**Utricularia resupinata** B. D. Greene.

Mud, Island lake, August 22, No. 1793 (fl.).

**Utricularia cornuta** Michx.

Quiet water in river lagoon, Pancake bay, July 16, No. 1796 (fl.); muddy pools, Xyris swamp, Pancake bay, August 5, No. 1797 (fl.); muddy places, near beaver meadow, Pancake bay, July 23, No. 1798 (fl.).

## PLANTAGINACEAE

**Plantago major** L.

Sand-bar near river mouth, Harmony river, September 18, No. 2411 (fr.); sand-bar between boulders, Harmony falls, September 3, No. 1973 (fr.); camp clearing, Pancake bay, August 23, No. 1974 (fr.); roadside, Carp lake, July 31, No. 1975 (fl.); damp soil, wagon road, Mamainse pt., July 23, No. 1976 (fl.); wet sand, Havilland bay, August 13, No. 1977 (fr.); Batchawana falls, August 27, No. 1978 (fr.).

***Plantago lanceolata* L.**

Roadside, Havilland bay, August 12, No. 1972 (fr.).

## RUBIACEAE

***Galium Aparine* L.**

Thin soil, Coppermine pt., August 20, No. 2259 (fr.).

***Galium kamschaticum* Steller.**

Depression at summit, elevation 1,900 feet, Mamainse mt., August 15, No. 2288 (fr.).

***Galium palustre* L.**

Maple cut-over, Sault Ste. Marie, July 9, No. 2296 (fr.).

***Galium Claytoni* Michx.**

Ditch by road, Corbeil pt., July 31, No. 2297 (fr.); cedar swamp, Gimlet Creek trail, Pancake bay, August 1, No. 2298 (fr.); swampy ground, Sawpit bay, August 21, No. 2299 (fr.); damp sand by stream west of Xyris swamp, Pancake pt., August 19, No. 2300 (fr.); maple-yellow birch association, Batchawana river, August 27, No. 2301 (fr.); roadside ditch, Corbeil pt., August 1, No. 2302 (fr.); damp ground, Mamainse road, July 22, Nos. 2303, 2304 (fr.); north shore, Batchawana is., September 12, No. 2305 (fr.).

***Galium asperellum* Michx.**

Cedar swamp, Gimlet creek, Pancake bay, July 15, No. 2260 (fl.); lagoon of river, Pancake bay, August 10, No. 2282 (fr.); shores opposite Sand pt., Batchawana is., September 12, No. 2283 (fr.); rock crevices, Mamainse pt., July 23, No. 2284 (fl.); wet sand at edge of boulders, Havilland bay, August 13, No. 2285 (fl., fr.); Batchawana falls, August 27, No. 2286 (fr.); low ground at falls, Carp river, September 7, No. 2287 (fr.).

***Galium triflorum* Michx.**

Cedar-yellow birch association, Pancake pt., July 23, No. 2289 (fr.); moist mixed woods, Pancake bay, July 16, No. 2405 (fr.); black ash swamp, Sault Ste. Marie, July 10, No. 2290 (fr.); open poplar woods, east ridge, Havilland bay, August 12, No. 2291 (fr.); birch woods, Batchawana is., September 11, No. 2292 (fr.); moist soil at roadside, Coppermine pt., August 20, Nos. 2293, 2294 (fr.); coniferous woods, Coppermine pt., August 20, No. 2295 (fr.).

***Mitchella repens* L.**

Batchawana falls, August 27, No. 2306 (fr.); maple-yellow birch association, Cross lake (near Carp lake), July 25, No. 2307 (lv.); mixed hardwoods, Mamainse road, Mamainse pt., July 18, No. 2308 (fl.); hard maple-yellow birch stand, Gimlet creek, Pancake pt., July 15, No. 2309 (fl.); Pancake pt., July 13, No. 2310 (fr.); cedar swamp, Gimlet Creek trail, Pancake bay, July 12, No. 2311 (fr.); maple-yellow birch association, Mamainse pt., July 23, No. 2312 (fl.).

## CAPRIFOLIACEAE

**Sambucus pubens** Michx.—*S. racemosa* Am. auth., not L. See Rhod. 35: 310 (1933).

Gravelly soil, Batchawana village, August 14, No. 1195 (lv.); hill-top, Elderberry hill, Pancake bay, July 17, No. 1196 (fr.); rocky slope, Smith lake, July 23, No. 1197 (fr.); edge of woods, Corbeil pt., July 22, No. 1198 (fr.); rocky woods, Batchawana falls, August 27, No. 1199 (lv.); moist soil, Pancake tote road, Pancake pt., August 15, No. 1200 (lv.).

**Sambucus pubens**, forma **dissecta** (Britton) Fern.—*S. racemosa* L., var. *laciniata* Gray not Koch. See Rhod. 35: 310 (1933), and Mem. Torr. Bot. Club 5: 304 (1894).

Low ground on trail from Batchawana falls, Batchawana bay, August 30, No. 1046 (lv.).

**Viburnum Opulus** L., var. **americana** (Mill.) Ait.

River bank, Batchawana falls, August 28, No. 1210 (fr.); Pancake river, September 4, No. 1211 (fr.); moist sand, Pancake river, September 27, No. 1212 (fr.).

**Viburnum cassinoides** L.

Roadside, Pancake tote road, Pancake pt., September 6, No. 1204 (fr.); dry aspen sand-plain, Batchawana bay, July 19, No. 1205 (fr.); open-grown poplar, Corbeil pt., July 31, No. 1206 (fr.); maple cut-over, Sault Ste. Marie, July 9, No. 1207 (fl.); low places, oak woods, Sand pt., September 12, Nos. 1208, 1209 (fr.).

**Symphoricarpos albus** (L.) Blake.—*S. racemosa* Michx. See Rhod. 16: 118 (1914).

Open, woody slopes, east ridge, Havilland bay, August 12, No. 1201 (fr.); thin soil on rocks east ridge, Havilland bay, August 12, No. 1202 (fr.); talus slope, Carp lake, September 5, No. 2460 (fr.).

**Linnaea borealis** L., var. **americana** (Forbes) Rehder.

Sandy woods, Pancake bay, July 12, No. 1182 (fl.); sphagnum, Batchawana is., September 11, No. 1181 (lv.).

**Triosteum perfoliatum** L., var. **aurantiacum** (Bickn.) Wieg.—*T. aurantiacum* Bickn. See Rhod. 25: 202 (1923).

Talus slope, Batchawana falls, August 29, No. 1203 (fr.).

**Lonicera canadensis** Marsh.

Deep loam, hard maple-yellow birch association, Corbeil pt., July 15, No. 1183 (fr.); poplar-birch slope, Corbeil pt., July 28, No. 1184 (fr.); maple woods, Smith lake, July 23, No. 1185 (fr.); edge of sandy woods at camp, Pancake bay, July 12, No. 1186 (fr.).

**Lonicera oblongifolia** (Goldie) Hook.

Xyris swamp, Pancake pt., August 16, No. 1194 (lv.).

**Lonicera hirsuta** Eaton.

Pancake river, September 4, No. 1187 (immature fr.); roadside, Pancake tote road, Pancake pt., September 6, No. 1188 (fr.); lava slope, Mamainse pt., July 13, No. 1189 (fl.); lava slope, Mamainse pt., July 13, No. 1190 (fl.); cedar swamp, Batchawana is., September 9, No. 1191 (fr.);



maple cut-over, Sault Ste. Marie, July 9, *No. 1192* (fl.); cedar swamp, Pancake bay, July 12, *No. 1193* (fl.); gravelly soil, Batchawana village, August 14, *No. 2459* (fr.).

**Diervilla Lonicera** Mill.

Balsam-birch woods, Coppermine pt., September 2, *No. 1176* (fr.); sandy woods, near camp, Pancake bay, July 12, *Nos. 1177, 1179* (fl.); maple cut-over, Sault Ste. Marie, July 9, *No. 1178* (fl.); maple-yellow birch association, Mamainse pt., July 23, *No. 1180* (fr.).

CAMPANULACEAE

**Campanula rotundifolia** L.

Batchawana is., August 27, *No. 1266* (immature fr.); Batchawana falls, August 27, *No. 1267* (immature fr.); beach, Batchawana is., September 13, *No. 1268* (fl.); rock crevices, Pancake bay, August 1, *No. 1269* (fl.); sand beach, Sand pt., September 12, *No. 1270* (fl., fr.); lava crevices, Mamainse pt., July 13, *No. 1271* (fl.); lava crevices, Gros Cap, July 11, *No. 1272* (fl.).

**Campanula uliginosa** Rydb.

Wet places, beaver meadow, Pancake pt., August 1, *No. 2463* (fl.); low ground in beaver meadow, Pancake bay, July 23, *No. 1273* (fl.); shallow water, Havilland bay, August 13, *No. 1274* (fl.); swamp, Batchawana is., August 10, *No. 1275* (fr.); moist meadow, Batchawana falls, August 29, *No. 1276* (fl.).

LOBELIACEAE

**Lobelia Kalmii** L.

Swamp, Batchawana is., September 10, *No. 1908* (fl.); wet sand beach, Batchawana falls, August 28, *No. 1909* (fl.); wet sand, Batchawana falls, August 27, *No. 1910* (fl.); wet sand, Mamainse pt., July 13, *No. 1911* (fl.); rock crevices, in small colonies, shore of Pancake bay, August 31, *No. 1912* (fl.); swampy ground, Xyris swamp, Pancake bay, August 5, *No. 1913* (fl.); sand in rock crevices, Batchawana falls, August 28, *No. 1914* (fl.); carex swamp, Batchawana is., September 10, *No. 1915* (fl.).

**Lobelia Dortmanna** L.

Shallow water, in sand, Pancake lake, August 15, *No. 1906* (immature fr.); shallow water, Island lake, August 22, *No. 1907* (immature fr.).

COMPOSITAE

**Eupatorium maculatum** L. *See Rhod. 22: 64* (1920).

Batchawana is., September 10, *No. 1629* (fl.); Batchawana is., September 10, *No. 1630* (fl.); beaver meadow, Batchawana is., August 28, *No. 1628* (fl.).

**Eupatorium maculatum** L., f. *albino*.

Roadside, Havilland bay, August 12, *Nos. 2600, 2601* (fl.).

**Eupatorium maculatum** L., var. *foliosum* (Fern.) Wieg.—*E. purpureum*, var. *foliosum* Fern. *See Rhod. 22: 66* (1920).

Mixed deciduous woods, Carp lake, September 5, *No. 1627* (fl.).

**Eupatorium perfoliatum** L.

Beaver meadow, Batchawana falls, August 27, Nos. 1623 (fr.), 1624 (fr.); shores, Batchawana is., September 10, No. 1625 (fl.); damp sand, Havilland bay, August 13, No. 1626 (fl.).

**Solidago hispida** Muhl.

Lake shore, Pancake pt., September 7, No. 1741 (fr.); sand beach, Sand pt., September 12, Nos. 1776 (fl.), 1768 (fl.); open sand-plain, Goulais bay, September 18, No. 1775 (fl.); mixed woods, on ridge above Carp lake, September 5, No. 1778 (fl.); beach, Batchawana is., September 13, No. 1779 (fl.); rock crevices on eastern shore, Pancake bay, August 1, No. 1780 (fl.); thin open soil, east ridge, Havilland bay, August 12, No. 1781 (fl.); Harmony river, August 13, No. 1783 (fl.); rock crevices, Mamainse mt., elevation 1,900 feet, July 23, No. 1784 (fl.); open rocky soil, east ridge, Havilland bay, August 12, Nos. 1785 (fl.), 1786 (fl.); sandy woods at mouth of Harmony river, September 3, No. 1787 (fl.); beach, Pancake bay, September 18, No. 1775 (fl.); mixed woods, on ridge above Carp lake, August 29, No. 1789 (fl.); talus slope, Batchawana falls, August 29, No. 1790 (fl.).

**Solidago macrophylla** Pursh.

Damp shady places, Carp falls, September 7, No. 1752 (fr.); cedar swamp, Corbeil pt., August 22, No. 1751 (fl.); rock crevices, Mamainse mt., elevation 1,900 feet, August 15, No. 1750 (fl.); Batchawana falls, August 27, No. 1747 (fl.); at falls, Carp river, September 6, No. 1749 (fl.); rocky ground, Pancake lake, July 23, No. 1748 (fl.); damp woods, Batchawana falls, August 27, No. 1753 (fl.).

**Solidago Randii** (Port.) Britton.

Rock crevices on eastern shore, Pancake bay, August 1, No. 1731 (fl., fr.); sandstone crevices, Corbeil pt., August 14, No. 1732 (fl., fr.); lava crevices, Mamainse pt., July 13, Nos. 1733 (fl.), 1734 (fl.), 1735 (fl., fr.), 1739 (fl.); lava crevices, Coppermine pt., August 20, Nos. 1730 (fl., fr.), 1736 (fl., fr.), 1737 (fl., fr.), 1738 (fl., fr.); gravelly soil, Batchawana village, August 14, No. 1740 (fr.); lava crevices, Mamainse pt., September 2, No. 1742 (fl., fr.); sandy beach, Batchawana bay, July 24, No. 1743 (fl.).

**Solidago racemosa** Greene.

Gravelly beach, Mamainse pt., July 13, No. 1704 (fl.).

**Solidago uliginosa** Nutt.

Swampy ground, Sawpit bay, August 21, No. 1754 (fl.); low places, open-grown poplar, Pancake bay, August 23, No. 1755 (fl.); Xyris swamp, Pancake bay, August 16 Nos. 1756 (fl., fr.), 1757 (fl., fr.); roadside, Corbeil pt., August 5, No. 1758 (fl.); sphagnum bog, Pancake bay, July 23, No. 1759 (fl.); Xyris swamp, Pancake bay, August 5, No. 1760 (fl.).

**Solidago juncea** Ait.

Batchawana river, August 30, No. 1745 (fl.); gravel beach, Batchawana falls, August 28, No. 1746 (fl.).

***Solidago rugosa* Mill.**

Swampy shore, Island lake, August 22, No. 1716 (fl.); roadside, Sawpit bay, August 19, No. 1717 (fl.); field, Stony pt., August 23, No. 1718 (fl., fr.); edge of woods, Sawpit bay, August 21, No. 1719 (fl.); bank of river, Batchawana falls, August 27, No. 1720 (fl.).

***Solidago rugosa* Mill., var. *villosa* (Pursh) Fern.**

Alder association, Corbeil pt., August 8, No. 1721 (fl.); open-grown poplar, Corbeil pt., July 29, No. 1722 (fl.); roadside, Batchawana falls, August 21, No. 1723 (fl.); swampy ground, Xyris swamp, Pancake bay, August 16, No. 1724 (fl.); open poplar association, Corbeil pt., August 5, No. 1725 (fl.); alder swamp, Batchawana is., September 9, No. 1726 (fl.); damp places at falls, Carp river, September 6, No. 1727 (fl.); Batchawana is., September 10, No. 1728 (fl.).

***Solidago nemoralis* Ait.**

East ridge, Havilland bay, August 12, No. 1729 (fl.).

***Solidago canadensis* L.**

Birch woods, Batchawana is., September 11, No. 1702 (fl.); sandy soil, on eastern shore, Pancake bay, August 1, No. 1703 (fl.); sandstone crevices, Corbeil pt., August 14, No. 1704 (fl.); lava crevices, Mamainse harbour, September 2, No. 1705 (fr.); fields, Batchawana village, August 14, No. 1706 (fl.); roadside, Havilland bay, August 12, No. 1707 (fl.); open poplar association, Corbeil pt., August 5, No. 1708 (fl.); open-grown poplar association, Corbeil pt., July 31, No. 1709 (fl.); sandstone crevices, Corbeil pt., August 14, No. 1710 (fl.); field, Stony pt., August 23, No. 1711 (fl., fr.); sandy roadside, Batchawana falls, August 27, No. 1712 (fl.); roadside, Havilland bay, August 12, No. 1713 (fl.); open-grown poplar association, Corbeil pt., July 31, No. 1714 (fl.); damp bank, Batchawana falls, August 27, No. 1715 (fl.).

***Solidago graminifolia* (L.) Salisb.**

Rock crevices, Batchawana falls, August 27, Nos. 1761 (fr.), 1763 (fl.); by rock pool, Mamainse pt., September 2, No. 1762 (fr.); grassy marsh, Batchawana falls, August 29, No. 1764 (fl.); low places behind beach, Sand pt., September 12, No. 1765 (fl.); low places in clearing, Batchawana is., September 13, No. 1766 (fl.); damp sand in river lagoon, Pancake bay, August 10, No. 1767 (fl.); gravel beach, Batchawana falls, August 28, No. 1769 (fl.); low ground, Stony pt., August 23, No. 1770 (fl.); swamp, Island lake, August 22, No. 1771 (fl.); rock crevices, Mamainse pt., July 23, No. 1772 (fl.); swampy ground, Sawpit bay, August 21, No. 1773 (fl.); shores, Batchawana is., September 10, No. 1774 (fl.).

***Aster macrophyllus* L.**

Field, Stony pt., August 23, No. 1484 (fl.); roadside, Carp lake, September 7, No. 1486 (fl.); clearing, Batchawana is., September 11, No. 1487 (fl.); roadside, Pancake road, September 6, No. 1489 (fl.); open poplar woods, east ridge, Havilland bay, August 12, No. 1491 (fl.); roadside, Sawpit bay, August 19, No. 1492 (fl.).

**Aster macrophyllus** L., var. **velutinus** Burgess.

Open, sandy woods, Pancake pt., September 5, *Nos.* 1488 (fl., fr.), 1485 (fl., fr.); gravel bar, Batchawana falls, August 28, *No.* 1490 (fl.).

**Aster Lindleyanus** T. and G.

Goulais bay, September 18, *No.* 1493 (fl.).

**Aster laevis** L.

Open sand-plain, Goulais bay, September 18, *No.* 1483 (fl.).

**Aster Faxoni** Porter.—*A. polyphyllus* Willd.

Open sand-plain, Goulais bay, September 18, *No.* 1498 (fl.).

**Aster lateriflorus** (L.) Britton.

Sand bank, Carp river, July 29, *No.* 1518 (fl.); shores, Pancake lagoon, Pancake bay, August 10, *No.* 1519 (fl.); rock ledges, Batchawana falls, August 29, *No.* 1520 (fl.); Carp river, September 6, *No.* 1521 (fl.); gravel bars, Batchawana falls, August 28, *Nos.* 1522, 1526 (fl.); roadside, Pancake tote road, Pancake pt., August 6, *No.* 1523 (fl.); Batchawana falls, August 27, *No.* 1524 (fl.); roadside gravel, Pancake pt., August 22, *No.* 1525 (fl.); rocky stream bank, Mamainse pt., July 23, *No.* 1527 (fl.); open poplar association, Corbeil pt., August 5, *No.* 1528 (fl.).

**Aster Tradescanti** L.

Field, Stony pt., August 23, *No.* 1541 (fl.); Chapman's field, Pancake bay, August 23, *No.* 1542 (fl.); low ground, Sawpit bay, August 21, *No.* 1543 (fl.); birch woods, Batchawana is., September 11, *No.* 1544 (fl.); sandy beach, Havilland bay, August 13, *No.* 1545 (fl.); low cleared places, Batchawana is., September 13, *No.* 1546 (fl.); clay roadside, on ridge, Batchawana bay, July 19, *No.* 1547 (fl.); swampy ground, Batchawana village, August 14, *No.* 1548 (fl.); open-grown poplar, Corbeil pt., July 31, *No.* 1549 (lv.).

**Aster junceus** Ait.

Swamp, Batchawana is., September 10, *No.* 1500 (fl.); sand beach, Sand pt., July 12, *No.* 1499 (fl.); cedar swamp, Batchawana is., September 9, *No.* 1501 (fl.).

**Aster longifolius** Lam.

Beach, Batchawana is., September 12, *No.* 1493 (fl.); beach, Batchawana is., September 13, *No.* 1494 (fl.); edge of sandy woods, Sand pt., September 12, *Nos.* 1495, 1496 (fl.); sand beach, Sand pt., September 12, *No.* 1497 (fl.).

**Aster puniceus** L.

Sandy roadside, Corbeil pt., August 7, *No.* 1529 (fl.); field, Stony pt., August 23, *No.* 1530 (fl.); moist hollow, Mamainse mt., elevation 1,900 feet, August 15, *No.* 1531 (fl.); old clearing, Batchawana is., September 9, *No.* 1532 (fl.); wet clay soil along trail, Harmony river, September 3, *No.* 1533 (fl., fr.); Batchawana falls, August 27, *No.* 1534 (fl., fr.).

The last two numbers are tentatively placed under this species although they are not typical. In the opinion of Dr. K. M. Wiegand they may be hybrids between *A. puniceus* and some other species, possibly *A. ericoides*.

***Aster puniceus* L., var. *oligocephalus* Fern.**

Pancake pt., August 22, No. 1535 (fl.).

***Aster lucidulus* (Gray) Wieg.**—*A. puniceus*, var. *lucidulus* Gray. See Rhod. 26: 4 (1924).

Alder swamp, Batchawana is., September 9, No. 1538 (fl.); cedar swamp, Corbeil pt., August 22, No. 1539 (fl.).

***Aster umbellatus* Mill.**

Gravel beach, Batchawana falls, August 28, No. 1511 (fl.); turf between stones on shore, Corbeil pt., July 29, No. 1512 (fl.); swamp, Batchawana is., September 10, No. 1513 (fl., fr.); beside Pancake tote road, Pancake pt., September 5, No. 1514 (fl.); low, moist area, base of Mamainse mt., August 15, No. 1515 (fl.); sandstone crevices, Corbeil pt., August 14, No. 1516 (fl.).

***Aster ptarmicoides* T. and G.**

Rock crevices, on shore, Pancake pt., August 3, No. 1517 (fl.).

***Aster nemoralis* Ait.**

On log in bog, Carp lake, July 25, No. 1600 (fl.); Sawpit bay, August 21, No. 1503 (fl.); cedar swamp, Pancake pt., August 22, No. 1504 (fl.); swampy shore, Island lake, August 22, Nos. 1505, 1506 (fl.); carex swamp, Batchawana is., September 10, Nos. 1507, 1508 (fl.); swampy ground, Xyris swamp, Pancake pt., August 5, No. 1509 (fl.); sphagnum bog, beaver meadow, Pancake bay, July 23, No. 1510 (fl.).

***Erigeron philadelphicus* L.**

Black ash swamp, Sault Ste. Marie, September 9, No. 1616 (fl.); clay soil, Gimlet creek, Pancake bay, July 30, No. 1617 (fl., fr.).

***Erigeron annuus* (L.) Pers.**

Beach clearing, Batchawana is., September 12, No. 1621 (fr.); clearing, Harmony river, August 13, No. 1622 (fl.).

***Erigeron ramosus* (Walt.) BSP.**

Rock cut, Island lake, September 18, No. 1620 (fr.).

***Erigeron ramosus* (Walt.) BSP., var. *septentrionalis* Fern. and Wieg.** See Rhod. 15: 60 (1913).

Poplar-birch slope, Corbeil pt., July 27, No. 1618 (fl.); edge of alders, Sand pt., September 12, No. 1619 (fr.).

***Erigeron canadensis* L.**

Thin soil on rocks, east ridge, Havilland bay, August 12, No. 1613 (fl., fr.); roadside, Carp river, July 31, No. 1614 (fl.); rocky ground on shore, Mamainse pt., September 2, No. 1615 (fl., fr.).



***Antennaria canadensis* Greene.**

Lava slope, Mamainse pt., July 13, No. 1568 (late fl.); thin soil, rock crevices, Fawn hill, Pancake river, July 31, No. 1569 (lv.); fields, Batchawana village, August 14, No. 1570.

***Antennaria neodioica* Greene, var. *attenuata* Fern. See Rhod. 35: 345 (1933).**

Beach, Batchawana river, August 28, No. 1562 (late fr.); rock ledge, Mamainse mt., July 18, No. 1563 (late fl.); thin soil on lava, September 2, No. 1564 (late fr.); sandy soil, Batchawana falls, August 28, No. 1565 (late fr.); on rocks near shore, Mamainse pt., September 2, No. 1566 (late fr.); Batchawana falls, August 30, No. 1567 (late fl.).

***Anaphalis margaritacea* (L.) B. and H.**

Tote road southeast of Pancake river, July 17, No. 1557 (fl.); open, rocky soil, east ridge, Havilland bay, August 12, No. 1558 (fl.); Batchawana is., September 9, No. 1559 (fl.); rocky soil, Mamainse pt., July 23, No. 1560 (fl.); sand beach, Pancake bay, August 22, No. 1561 (fl.).

***Gnaphalium decurrens* Ives.**

Roadside, Carp river, July 31, No. 1631 (fl.); thin soil on rocks, east ridge, Havilland bay, August 12, No. 1632 (fl.); open field, Stony pt., August 23, No. 1633 (fl.).

***Gnaphalium uliginosum* L.**

Sparse on gravel bank, Havilland bay, August 13, No. 1634 (fr.); low ground, clearings, Batchawana is., September 11, No. 1635 (fl.).

***Ambrosia trifida* L.**

Chapman's field, Corbeil pt., July 29, No. 1555 (fr.).

***Ambrosia trifida* L., var. *integrifolia* (Muhl.) T. and G.**

Pancake bay, July 29, No. 1556 (fr.).

***Rudbeckia hirta* L.**

Damp clay by roadside, Havilland bay, August 12, No. 1684 (fl.); fields, Batchawana bay, July 22, No. 1685 (fl.).

***Coreopsis lanceolata* L.**

Colonies in grass, Gros Cap, July 11, No. 1612 (fl.).

***Bidens cernua* L.**

Edge of stream, Havilland bay, August 13, No. 1583 (fl.); low ground, clearing, Batchawana is., September 11, No. 1587 (fl.); swampy ground, Batchawana river, September 12, No. 1588 (fl.); Batchawana river, August 30, No. 1584 (fl.); swamp, Batchawana is., September 10, No. 1585 (fl.); marshy ground, Batchawana is., September 11, No. 1586 (fl.).

***Bidens cernua* L., var. *minima* (Huds.) DC. See Rhod. 24: 207 (1922).**

Wet ground, Harmony river, Sept. 3, No. 1590 (fl.); floating rotten log, Batchawana river, September 12, No. 1589 (fl.).

***Anthemis Cotula* L.**

Camp clearing, Pancake bay, August 22, No. 1571 (fl.).

**Achillea Millefolium L.**

Fields, Batchawana village, August 2, *No. 1550* (fl.); clearing, Batchawana is., September 11, *No. 1551* (fl.); open field, Mamainse pt., July 13, *No. 1553* (fl.); hemlock woods, Harmony river, August 13, *No. 1554* (fl.); roadway, Mamainse pt., July 23, *No. 1552* (fl.).

**Matricaria suaveolens** (Pursh) Buchenau.

Fields, Batchawana village, August 14, *No. 1674* (fr.); sand loam, roadside near camp, Pancake bay, July 20, *No. 1675* (fr.); camp clearing, Pancake bay, August 23, *No. 1676* (fr.).

**Chrysanthemum Leucanthemum L.**, var. **pinnatifidum** Lecoq and Lamotte.

Tote road, Pancake pt., September 6, *No. 1592* (fl.); clearing, Batchawana is., September 11, *No. 1593* (fl.); open, sandy woods near camp, Pancake bay, September 12, *No. 1594* (fl.).

**Chrysanthemum Balsamita L.**, var. **tanacetoides** Boiss.

Gravel soil, Coppermine pt., August 20, *No. 1591* (fl.).

**Tanacetum huronense** Nutt., var. **typicum**. See Rhod. 37: 334 (1935).

Open, sandy ground, Harmony river, September 16, *No. 1599* (fr.); beach, Harmony bay, September 18, *No. 1698* (fl.).

**Artemisia caudata** Michx.

Gravel bars, Batchawana river, August 28, *No. 1573* (fl.); lava crevices, Coppermine pt., August 20, *No. 1574* (fl.); shores, Batchawana is., September 12, *No. 1575* (fl.); lava crevices, Mamainse pt., July 13, *No. 1576* (fl.); lava crevices, Mamainse pt., September 2, *No. 1578* (fr.); sand between boulders, at falls, Harmony river, September 3, *No. 1579* (fr.); rock crevices, on shore, Pancake pt., August 3, *No. 1580* (fl.).

**Artemisia canadensis** Michx.

Lava crevices, Mamainse pt., July 13, *No. 1577* (fl.).

**Artemisia ludoviciana** Nutt.

Roadside, Goulais bay, September 18, *No. 1572* (fl.).

**Petasites palmatus** (Ait.) Gray.

Low sandy ground, Black creek, Batchawana bay, July 16, *No. 1677* (lv.); Mamainse road, July 16, *No. 1678* (lv.); creek edge, Mamainse pt., September 2, *No. 1679* (lv.).

**Senecio aureus L.**

Woods, Dumbell lake, Pancake pt., July 15, *No. 1686* (fl.); black ash swamp, Sault Ste. Marie, July 18, *No. 1687* (fl.); bottom lands, Carp river, July 15, *No. 1688* (fl., fr.).

**Senecio pauperculus** Michx.

Rocky shore, Batchawana falls, August 28, *No. 1689* (fr.); lava crevices, Mamainse pt., July 13, *Nos. 1690* (fl.), *1691* (fl.), *1694* (fl., fr.), *1696* (fl.);

wet shores, Mamainse pt., July 13, *No. 1695* (fl.); sandstone crevices, Corbeil pt., August 14, *No. 1692* (fl.); rock crevices along shore, east end of Pancake bay, August 1, *No. 1693* (fl.); lava crevices, Gros Cap, Sault Ste. Marie, July 11, *No. 2409* (fl.).

***Arctium minus* (Hill) Bernh.**

Roadside, Mamainse road, Mamainse pt., August 2, *No. 1581* (fr.); roadside, Mamainse pt., September 2, *No. 1582* (fr.).

***Cirsium lanceolatum* (L.) Hill.**

Roadside, Coppermine pt., September 2, *No. 1599* (fr.); low coniferous woods, Batchawana is., September 9, *No. 1601* (fl.); fields, Batchawana village, August 14, *No. 1602* (fl.).

***Cirsium muticum* Michx.**

Open places, Carp river, September 6, *No. 6103* (fr.); damp soil, by trail, Pancake lake, August 2, *No. 1604* (fl., fr.); open poplar association, Corbeil pt., August 5, *No. 1605* (fr.); Batchawana falls, August 27, *No. 1611* (fr.); open places, Carp lake, September 5, *No. 1607* (fr.); opening on trail, 4 miles from mouth of river, west side, Harmony river, September 3, *No. 1608* (fr.); low ground at falls, Harmony river, September 7, *No. 1609* (fl.); beaver meadow, Batchawana falls, August 27, *No. 1610* (fl.).

***Cirsium arvense* (L.) Scop.**

Waste land, Carp lake, September 5, *No. 1596* (fr.); waste land, Batchawana bay, July 22, *No. 1597* (fl.); roadside, Batchawana bay, August 2, *No. 1598* (fl.).

***Cichorium Intybus* L.**

Sandy places, Carp river, August 15, *No. 1595* (fl.).

***Hieracium aurantiacum* L.**

Thin soil on rocks, sparse, east ridge, Havilland bay, August 12, *No. 1636* (fr.).

***Hieracium venosum* L.**

Sandy woods, Pancake bay, July 12, *No. 1646* (fl.).

***Hieracium venosum* L., var. *subcaulescens* T. and G.**

Sandy woods, Pancake bay, July 12, *No. 1647* (fl.).

***Hieracium scabrum* Michx.**

Gravelly soil, Batchawana village, August 14, *No. 1656* (fl.); gravelly soil, open poplar association, Pancake bay, August 23, *No. 1657* (fl.); open-grown poplar, Corbeil pt., July 31, *No. 1658* (fl.); open poplar woods, east ridge, Havilland bay, August 12, *No. 1659* (fl.); fields, Batchawana village, August 14, *No. 1660* (fl.); open poplar association, Corbeil pt., August 5, *No. 1661* (fl.).

**Hieracium scabrum** Michx., var. **tonsum** Fern. and St. John. See Rhod. 16: 183 (1914).

Rocky soil, Island lake, September 18, No. 1662 (fl.); gravelly soil, poplar stand, Pancake bay, August 23, No. 1663 (immature fr.); sandy ground at beach, Pancake bay, July 22, No. 1664 (fl.).

**Hieracium canadense** Michx.

Batchawana falls, August 27, No. 1637 (fl., fr.); sandstone crevices, Corbeil pt., August 14, No. 1638 (fl.); roadside, Batchawana village, August 14, No. 1639 (fl.); thin soil and rock crevices on shore, Pancake bay, August 1, No. 1640 (fl.); roadside, moist soil, Coppermine pt., August 20, No. 1641 (fl.); rocky ground, stream bank, Mamainse pt., July 23, No. 1642 (fl.); Harmony river, August 13, Nos. 1643, 1644 (fl.); field, Stony pt., August 23, No. 1645 (fl.).

**Hieracium scabriusculum** Schwein.

Sandy soil at beach, Pancake bay, July 22, No. 1648 (fl.); gravelly soil, Batchawana village, August 14, No. 1649 (fl.); thin soil, Coppermine pt., August 20, No. 1650 (fl.); beach, Batchawana is., September 13, No. 1651 (fr.); open, rocky soil, east ridge, Havilland bay, August 2, No. 1652 (fl.); sand beach, Sand pt., September 12, No. 1653 (fl.); thin soil, rock crevices, eastern shore, Pancake bay, August 1, No. 1654 (fl.); fields, Batchawana village, August 14, No. 1655 (fl., fr.); Batchawana falls, August 27, No. 2530 (fr.).

**Taraxacum officinale** Weber.

Roadside, Harmony river, August 13, No. 1700 (fl.); clearing, Coppermine pt., August 20, No. 1701 (fl.).

**Lactuca canadensis** L.

Open-grown poplar, Corbeil pt., July 31, No. 1665 (fr.); open poplar association, Corbeil pt., August 5, No. 1666 (fr.); open-grown poplar, Corbeil pt., August 23, No. 1667 (fr.).

**Lactuca spicata** (Lam.) Hitchc.

Roadside, Pancake road, September 6, No. 1668 (fr.); Carp lake, September 5, No. 1669 (fr.); Chapman's field, Corbeil pt., August 23, No. 1670 (fr.); open-grown poplar, Corbeil pt., July 31, No. 1671 (fr.); clearing, Batchawana is., September 11, No. 1672 (fr.); open-grown poplar, Corbeil pt., July 31, No. 1673 (fr.).

**Prenanthes racemosa** Michx.

Damp crevices of sandstone, Corbeil pt., August 14, No. 2408 (fl., fr.); Sawpit bay, August 21, No. 1680 (fl., fr.); Xyris swamp, Corbeil pt., August 16, No. 1681 (fl., fr.); Xyris swamp, Pancake pt., August 16, No. 1682 (fl.); low ground, Mamainse harbour, September 2, No. 1683 (fl., fr.).

**Sonchus asper** (L.) Hill.

Camp clearing, Pancake bay, August 23, No. 1697 (fl., fr.).

# A STUDY OF THE MAMMAL POPULATION OF THE VICINITY OF PANCAKE BAY, ALGOMA DISTRICT, ONTARIO

By C. H. D. Clarke

## INTRODUCTION

The field work on which this study is based was carried out by the writer and Mr. H. P. Stovell, under the direction of Prof. R. C. Hosie, for the National Museum of Canada, from July 11 to September 20, 1935.

For a detailed description of the region, the reader is referred to Professor Hosie's report. The habitat types under which the mammal population is discussed will be found amply described therein. It should, however, be observed, that for the most part the mammals were associated with vegetation only in the broadest sense, and most of the habitats discussed for them will be found subdivided in the botanical discussion. Wherever a difference in mammal fauna was found for a particular vegetation type, established by a sufficiently large catch to be significant, that type is among those to be found in the ensuing discussion.

The percentage catch of various species taken in significant numbers is tabulated. In the table the habitat types are referred to by Roman numerals, which are used here for the same types.

Two different systems of trapping were used extensively, namely the conventional Biological Survey mouse-traps set out in lines, and water-buckets, sunk below the surface of the ground. It should be said, however, that they are not strictly comparable. *The expression, "one trap-night per cent" for mouse-traps must be viewed as showing a larger population than the same percentage catch in water-traps.* The same scale is used for both systems simply because there are no criteria available that could serve to reduce them to equality.

## HABITAT TYPES

The habitats showing recognizable variation in populations were as follows:

I. *High-dry.* All dry sites, whether of balsam-white birch association on a sandy substratum, or of maple-covered ridges, were found to have substantially the same small mammal population, and the various subdivisions were, consequently, discarded, and all the data combined. The fauna was rather restricted, containing chiefly *Sorex cinereus* and *Blarina brevicauda* among the shrews, a noticeably strong representation of *Peromyscus*, a fair showing of *Clethrionomys gapperi*, with *Napaeozapus insignis* showing up (as does also *Sorex cinereus*) in the results from water-traps.

II. *Talus Slopes.* The talus at the foot of cliffs is a restricted habitat, notable for its production of *Microtus chrotorrhinus*. It seems to lie between wet and dry sites.



III. *Spruce-Cedar Swamps*. A great variety of timbered swamps containing these two trees and others in varying proportion were trapped without revealing significant differences in the mammal population. The principal feature is the absence of *Peromyscus* and *Napaeozapus*.

IV. *Xyris Swamp*. This quite restricted habitat characterized by the abundance of *Xyris* produced a very notable catch of *Sorex fumeus*.

V. *Edge of Spruce-Cedar Swamp*. This line between wet and dry sites proved to contain mammals characteristic of both, with the addition of *Microtus chrotorrhinus*, also found rarely in the swamp itself and more commonly in talus slopes.

VI. *Banks of Small Streams*. Both mouse-traps and water-traps were set along the banks of small streams in fair variety. Although differences between one stream and another were found, they were of no particular importance, so here again a number of sites are combined. A considerable abundance of *Zapus* was shown by the water-traps, and a highly significant catch of *Napaeozapus* and *Sorex palustris*.

VII. *River Bank*. Many water-traps were set within a few feet of Pancake river and the lagoon at its mouth, and a small number of mouse-trap lines were run as a control. A variety of mammals were taken in water-traps, among which *Sorex cinereus* and *Zapus* deserve special mention. The mouse-traps, however, showed *Blarina* and *Peromyscus* instead of repeating the catch of the water-traps.

VIII. *Hay Barn*. A small number of mouse-traps set in an open barn full of freshly hauled hay took a large catch of *Peromyscus* and *Microtus pennsylvanicus*, with one *Zapus*. This "habitat" is to be regarded as a concentration of the open field in which no mammals were caught.

IX. *Shore-line*. The meeting point of vegetation and sand on the shore of lake Superior was apparently a highway for *Peromyscus*.

X. *Open Sand*. In this and the next type the catch of *Peromyscus* is probably high because use is made of the scattered pieces of driftwood in setting traps. These, being few and far apart, are naturally all visited by the exploring mice. As no mice were found by turning up logs, it is to be assumed that all those taken were exploring from outside.

XI. *Brûlé*. Just prior to our visit, on May 24, a large area of varied flora was burned clean. We found only the bare soil, with a few standing and some fallen stumps. On the ground it resembled the open lake shore in its lack of vegetation, and it is to be noted that its *Peromyscus* population was quite similar. Because it represented the beginning of a new ecological succession it is of interest to record the use of this area by mammals so soon after the fire.

*Peromyscus* have been noted. Probably some lived in the area, as a couple were taken at a hole in the ground. There was no evidence of shrews. Red bats were identified flying about. Moose and deer occasionally crossed it. Bear, fox, hare, and porcupine were recorded in it,

although they all appeared not to live in the burnt-over area. Chipmunks of both species, and red squirrels, seemed in many instances to be actually established in the brûlé. Some of them had bobbed tails, which may have been the result of fire catching their brushes. Brown's (1923) description of the behaviour of various mammals in forest fires shows that such a thing could easily happen.

#### DISCUSSION

Although a record is presented in the accompanying table of the abundance of various species of small mammals in the various habitats in the region of Pancake bay in the summer of 1935, it is necessary to call attention to certain restrictions. Populations of small mammals are subject to regular fluctuations, during the course of which changes may be expected in the proportions of various species in a habitat as well as in the total population. The usual cycle of numbers for species of small mammals is from three to four years, as shown by Elton (1924). It is quite probable that when any given species is abundant it spreads out from its optimum range over a wide area. The most suitable and most desirable sites may be expected to be characterized for any species by its greatest abundance in a time of scarcity. The present study seems to be one of a population with many species in a condition of comparative abundance. This, however, cannot be proved because data are lacking for other years in the same region.

#### WATER-TRAPS

During the course of the summer an experiment in small mammal collecting by the systematic use of sunken buckets was initiated. The camp headquarters of a road camp had recently been vacated, and on a "jackpot," or dump, in the rear of the camp, were a number of discarded 50-pound shortening pails, a few miscellaneous buckets, and a tub.

A set may be made wherever it is possible to dig a hole deep enough to have the rim of the bucket below ground level. If the ground is high and dry then the bucket must be tight and have its own water supply. In low sites holes may be punched in the bucket and water allowed to seep in. The water-level should be at least 2 inches below the rim of the trap if it is to work at all, and 6 inches is much better. An inch of water in the bottom is enough to drown many species, but water enough to drown mammals of medium size is desirable. Lastly the sides of the bucket must fit tightly against the sides of the hole. Not all sets were successful—far from it. Flooding was the chief cause of failure, and all failures may be ascribed either to faults in water supply or bucket.

The grand total catch of mammals in water-traps successfully established and mouse-traps set out in lines is given (Table I). From the table it is evident that water-traps do take mammals in variety and numbers. In so far as numbers are concerned some individual traps made remarkable catches, but there is nothing to be gained in the comparison by singling them out. In comparing the two types of trap with regard to variety it is necessary to separate the data according to habitat. In four of the types given in Table I, both water-trapping and mouse-trapping were carried out.

## DISCUSSION OF TABLE

The table demonstrates that water-traps were more efficient than mouse-traps in certain situations, such as along streams and at the edge of the river. These areas are possibly runways and concentration grounds. Even in such areas their success is not such as to exclude mouse-traps. In some other sites water-traps did not do so well, but even there results were at times obtained that justify the statement that they can be used profitably in any site.

When selectivity as regards species is considered the efficiency of water-traps in taking jumping mice and small shrews is very striking. Voles and lemming mice seem to have been taken to a slightly better advantage in mouse-traps, but again water-traps made good and often surprising catches. Deer mice (*Peromyscus maniculatus*) and short-tailed shrews (*Blarina brevicauda*) seemed to avoid the water-traps, as they were taken in considerably greater numbers by mouse-traps.



Figure 34. Water-trap with one night's catch, Pancake bay, Algoma district, Ontario, 1935. (Photo by A. P. Leslie.)

## WATER-TRAPS IN MOLE TRAPPING

Mr. Stovell found that a tight bucket of water could be used to some advantage in mole runways. Both *Parascalops breweri* and *Condulura cristata* had been taken in a runway across a path along Pancake river. It was found that a water-trap for moles should be sunk so that the rim of the bucket is several inches below the runway on each side. A little loose

sand should be placed in each entrance. The trap will work once or twice and then the moles will get around it, necessitating a change of the scene of operations. In this way Mr. Stovell took a *Parascalops breweri* and a *Condylura cristata* in one runway, and a *Condylura* in a second, besides one *Microsorex hoyi*, one *Blarina brevicauda*, and one *Zapus hudsonius*. *Condylura* seems to frequent the surface of the ground at times, and may be taken in any water-trap in a wet site.

#### *Advantage of Water-traps*

(1) They offer a means of collecting small mammals on a different basis from mouse-traps, and with a different specific selectivity.

(2) Trapping may be repeated any time except in winter under identical conditions.

(3) No bait is required, and there is no spring or trigger.

(4) Once established, a set runs itself.

(5) If the water is cold the hair of specimens is kept from slipping for some time.

(6) No specimens are damaged and no traps robbed. Would-be robbers are themselves taken.

(7) They may be used for moles and in other runways.

#### *Disadvantages of Water-traps*

(1) They are cumbersome in the form described above.

(2) The collector of ectoparasites will find that he can not be sure of his host records.

As against the first objection mentioned it may be urged that a portable unit could be made by any competent tinsmith. A very practical set would be one with the traps nested, a bottom on the outermost and then every second or third trap bottomless. Those lacking bottoms could be set where there is a natural water supply. The depth of metal in the trap need not exceed one foot.

TABLE I

Summary of catch of mammals by habitat types, in mouse-traps (upper figure) set out in lines, and in water-traps (lower figure) expressed in trap-night per cent. The symbol X signifies that no water-traps were used in that type.

	I. High-dry	II. Talus slope	III. Spruce-cedar swamp	IV. Xyris swamp	V. Edge of spruce-cedar swamp	VI. Banks of small streams	VII. River bank	VIII. Hay barn	IX. Shore-line	X. Open sand	XI. Brûlé of May 24, 1935	Total
Total trap-nights.....	392	115	1,165	150	453	419	186	56	25	16	89	3,175
	50	X	84	X	X	163	272	X	X	X	X	569
Catch in per cent of trap-nights..	13.0	13.0	7.7	9.3	15.6	9.5	19.3	35.7	68.0	12.5	13.5	11.8
	30.0	X	39.3	X	X	90.8	76.0	X	X	X	X	70.7
<i>Sorex cinereus</i> .....	0.5	0	2.6	1.3	2.0	1.2	0	0	0	0	0	1.6
	18.0	X	17.9	X	X	12.3	18.4	X	X	X	X	16.5
<i>Sorex fumeus</i> .....	0	0	0	2.7	0.2	0	1.1	0	0	0	0	0.2
	0	X	2.4	X	X	0.6	4.0	X	X	X	X	2.5
<i>Sorex palustris</i> .....	0	0	0.1	0	0	0.2	0	0	0	0	0	0.1
	0	X	0	X	X	7.4	1.5	X	X	X	X	2.8
<i>Microsorex hoyi</i> .....	0	0	0	0	0	0	0	0	0	0	0	0.0
	0	X	1.2	X	X	1.8	1.8	X	X	X	X	1.6
<i>Blarina brevicauda</i> .....	2.0	0.9	1.0	2.0	2.6	0	3.8	0	0	0	0	1.4
	0	X	0	X	X	1.2	2.6	X	X	X	X	1.6
<i>Peromyscus maniculatus</i> .....	7.7	4.3	0.1	0.7	3.1	2.6	10.7	25.0	60.0	12.5	12.4	3.9
	0	X	0	X	X	1.8	2.2	X	X	X	X	1.6
<i>Synaptomys cooperi</i> .....	0	0	0.3	0	0.2	0	0	0	0	0	0	0.2
	0	X	0	X	X	1.2	0.4	X	X	X	X	0.5
<i>Clethrionomys gapperi</i> .....	2.0	5.2	2.2	2.7	5.1	1.0	1.6	0	4.0	0	0	2.4
	4.0	X	15.5	X	X	5.5	7.3	X	X	X	X	7.7
<i>Microtus pennsylvanicus</i> .....	0	0	0.5	0	0.2	1.7	0	8.9	0	0	0	0.6
	0	X	0	X	X	4.3	2.6	X	X	X	X	2.5
<i>Microtus chrotorrhinus</i> .....	0	2.6	0.1	0	2.2	0	0	0	0	0	0	0.4
	0	X	0	X	X	0	0	X	X	X	X	0.0
<i>Zapus hudsonius</i> .....	0.3	0	0.2	0	0	0.5	0.5	1.8	0	0	0	0.2
	0	X	1.2	X	X	17.8	25.7	X	X	X	X	17.6
<i>Napaecyzapus insignis</i> .....	0.3	0	0	0	0	1.2	0.5	0	0	0	0	0.2
	8.0	X	0	X	X	36.7	7.3	X	X	X	X	14.7
Additional species:												
<i>Condylura cristata</i> .....	0	0	0.2	0	0	0.2	0	0	0	0	0	0.1
	0	X	0	X	X	0	1.5	X	X	X	X	1.0
<i>Mustela cicognanii</i> .....	0	0	0	0	0	0	0	0	0	0	0	0.0
	0	X	1.2	X	X	0	0	X	X	X	X	0.2



TABLE I—Concluded

	I. High dry	II. Talus slope	III. Spruce-cedar swamp	IV. Xyris swamp	V. Edge of spruce-cedar swamp	VI. Banks of small streams	VII. River bank	VIII. Hay barn	IX. Shore-line	X. Open sand	XI. Brûlé of May 24, 1935	Total
Additional species—Conc.	0	0	0.2	0	0	1.0	1.1	0	4.0	0	1.1	0.4
<i>Eutamias minimus</i> .....	$\frac{0}{0}$	$\frac{0}{X}$	$\frac{0.2}{0}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{1.0}{0}$	$\frac{1.1}{0}$	$\frac{0}{X}$	$\frac{4.0}{X}$	$\frac{0}{X}$	$\frac{1.1}{X}$	$\frac{0.4}{0.0}$
<i>Tamias striatus</i> .....	$\frac{0.3}{0.0}$	$\frac{0}{X}$	$\frac{0}{0}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{0.1}{0}$
<i>Ondatra zibethica</i> .....	$\frac{0}{0}$	$\frac{0}{X}$	$\frac{0}{0}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{0}{0}$	$\frac{0}{0.7}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{0}{X}$	$\frac{0.0}{0.4}$

Total trap-nights:	Mouse-traps	3,175
	Water-traps	569
Total mammals caught:	Mouse-traps	375
	Water-traps	403

List of Mammals

Following is a list of species taken, observed, or reported, details of specimens preserved, and supplementary notes on abundance and distribution.

In all, a few less than one thousand individuals, of twenty-nine different species, were handled in the flesh. From these, some five hundred and thirty-five specimens were preserved, of which five hundred and five were as study skins. Species marked with asterisk are represented in the collection.

(1) \**Parascalops breweri* (Bachman). Three specimens of this species were taken, all in the same runway. The mole-traps used were too coarse either for this species or the next, and very unreliable. The first specimen was taken by shooting at the trigger of a mole trap, thereby springing it on the mole, which had gone most of the way through without affecting the trap. The second was taken by an adaptation, by Mr. Stovell, of the water-trap. The third was in a Victor mole-trap.

The runway in question was on a side hill of the Pancake River trail. Mole runways seem to become visible on trails wherever the soil becomes compact enough to force the moles to go near the surface, a condition common on side hills. A number of runways were found on the Carp River road at some distance from camp. In my experience, runways in drier sites contain *Parascalops*, those approaching bottom lands, as the one described above, contain both *Parascalops* and *Condylura*, whereas those actually in clay or mud, and even under water, are inhabited by *Condylura* alone. *Blarina* will also use mole runways. They are, from observations at Pancake, two-way streets with twenty-four hour traffic.

Visitors to camp identified the present species as having been taken to the number of fifteen in a garden in Sault Ste. Marie.

(2) \**Condylura cristata* (Linnaeus). Fourteen specimens were taken as follows:

1. Five in water-traps along Pancake river.
2. Four in mouse-traps in wet areas.
3. Four in the same runway as *Parascalops*, including one in a water-trap, taken by Mr. Stovell.
4. One in a runway in clay in the river bottom land.

(3) \**Sorex cinereus cinereus* Kerr. Taking both water- and mouse-traps into consideration, this species was shown by the catch to be remarkably uniformly distributed. Forty-eight specimens (forty-one skins) were preserved out of a considerable number taken.

(4) \**Sorex fumeus fumeus* Miller. Rather rare and apparently more common in moist sites. A good catch was made by Mr. Stovell in the Xyris swamp, which was quite wet. Twenty specimens were preserved out of the twenty-one individuals taken.

(5) \**Sorex palustris hydrobadistes* Jackson. Taken along streams, including even the lagoon of Pancake river, and trapped once in a swamp, to make a total of eighteen specimens.

(6) \**Microsorex hoyi intervectus* Jackson. Ten specimens, all taken in water-traps, in situations varying from swamp to a sandy path (the river trail, where it was caught in a water-trap set for moles).

(7) \**Blarina brevicauda brevicauda* (Say). Common and widely distributed. Out of a number taken, nineteen skins and two skeletons were preserved.

(8) \**Myotis lucifugus lucifugus* (LeConte). One taken. This specimen was flying over the Pancake lagoon. Bats were not taken in numbers great enough to justify generalizations, but the fact may be recorded that the species found were all in different sites.

(9) \**Myotis keenii septentrionalis* (Trouessart). Four taken in the vicinity of an old lumber pile near the camp blacksmith shop.

(10) \**Lasionycteris noctivagans* (LeConte). Two taken on the new highway, near relict birch trees in the balsam-white birch association.

(11) \**Nycteris borealis borealis* (Müller). One taken on the highway in young balsam-white birch association. Individuals presumed to be of this species were seen early in the evening flying in the camp clearing and in the 1935 brûlé.

(12) *Ursus americanus* Pallas. Bears must be considered fairly common. One visited camp on the night of July 11, being clearly seen by most of the party. It attempted to enter the cookery. A bear was shot at the campsite in spring, before our arrival, and another at Coppermine point early in September. Tracks were frequent along roads and trails, and two bears were seen by members of the party, in addition to the one mentioned above.

(13) *Martes americana* (Turton). Marten are no longer found in the immediate vicinity of Pancake bay. One Indian informant said that they occurred at a few points only between the Algoma Central railway and lake Superior, although they were once common throughout. J. Craig, cook for the party, has trapped since 1929 at Mile 60, Algoma Central railway, and furnished information concerning his own catch and that of the next trapper inland from him, the farthest territory represented being 40 miles up Goulais river from the Mile 60 dam. One marten was trapped in this area during the season of 1934-5, and they have been consistently rare.

(14) *Martes pennanti* (Erxleben). A few fisher still occur in the Pancake area, although not enough to warrant any pursuit except tracking them down when the opportunity occurs. In this way, one or two are taken in the area each year. At Mile 60, where trap-lines may be expected to take a few, Mr. Craig got two in the 1934-5 season, and one of his neighbours got five.

(15) *\*Mustela cicognanii cicognanii* Bonaparte. Two specimens of this weasel were taken, one in a water-trap in a swamp, the other in a set made especially for it in the balsam-birch type. It was reported common the previous winter.

(16) *\*Mustela vison vison* Schreber. One mink was taken up Pancake river, and tracks were seen on the lake shore. They appeared to be scarce. At Mile 60 Craig took three in the 1934-35 season, and one of his neighbours took ten.

(17) *Lutra canadensis* (Schreber). Otter probably have occurred on the Pancake and other rivers in the camp area, though it is doubtful if they are found there now. At Mile 60 they are seen frequently, and have increased. The larger lakes of this region, as compared with the flat land around Pancake bay, may account for this difference in abundance.

(18) *\*Mephitis mephitis mephitis* (Schreber). Skunks were common, five being secured as specimens.

(19) *Vulpes fulva* (Desmarest). Though no specimens were taken, fox were quite common; signs were always in evidence along trails and roads. On August 2, while walking on the Carp River road, a fleeting glimpse was had of a fox 100 yards or so ahead.

(20) *Canis latrans latrans* Say. Brush wolves are reported in increasing numbers. All such reports come from the more settled country where timber wolves have been scarce or absent.

(21) *Canis lupus lycaon* Schreber. Not reported recently at Pancake bay, timber wolves appear to be scarce west of the railway. They are common enough up Goulais river, where the writer spent the summer of 1928 in the region now included in the Goulais game preserve. There a very large number of deer carcasses were found in what had been the winter yards. Many gave evidence of having been fed on by wolves, but it was not possible to ascertain whether the deer had actually been killed by wolves, or had died of starvation because of the very heavy snowfall.

(22) *Marmota monax* (Linnaeus). We were unable to secure a groundhog, though they are found locally throughout the region. There were groundhogs at Pancake until the fire of 1935 (May 24) either destroyed them or drove them out. From geographical considerations, the form is presumably *Marmota monax canadensis* (Erxleben).

(23) *\*Eutamias minimus borealis* (Allen). Abundant; twenty-nine were taken. This species is especially common in clearings, and is the only species in swamps. It is lacking in hardwood ridges except in slashed or cleared sites.

(24) *\*Tamias striatus griseus* Mearns. Ten specimens were taken. The species was found to be confined to drier sites, especially hardwood ridges.

(25) *\*Sciurus hudsonicus hudsonicus* (Erxleben). Abundant and almost universally distributed. Twenty-three specimens were taken.

(26) *\*Glaucomys sabrinus macrotis* Mearns. Twelve specimens were taken. The best spots for trapping this species were on and around relict white birches in the balsam-birch association.

(27) *\*Castor canadensis michiganensis* Bailey. When we arrived at Pancake the only information of the presence of beaver was of a dam somewhere in from Mamainse point. Later on in the summer small workings were started on both Carp and Pancake rivers, and one specimen was taken on the latter.

(28) *\*Peromyscus maniculatus gracilis* (LeConte). Abundant. Out of a large number taken, there were preserved forty-three skins and one skeleton. Its distribution was not as uniform as *Sorex cinereus* or *Clethrionomys gapperi*. It was almost, but not quite, absent from swamps, coming in at the edges, and becoming common as soon as dry ground was reached. In some of the sites depicted it is very common. The hay barn may be explained as a concentration area, and the line of vegetation at the shore is either a highway or a very narrow concentration area. The large numbers taken in the recently burnt area, and the almost exactly similar catch on open sand along the lake, certainly depend in part on the use in trapping of logs and driftwood, forming the only shelter on these sites.

Trapping of *Peromyscus* in the large cabin at headquarters gave results that may be of some interest. On our arrival the place was overrun, but persistent trapping from July 14 to July 21 brought the population to a point where six well-placed traps caught no mice, thirty-eight having been taken. Trapping ceased on July 24, two mice having been the catch for the last three nights. A month later they were as abundant as at first. Trapping soon brought their numbers down, but there was at this time a great deal of activity in the *Peromyscus* population at large, so that there were always a few to be taken during September. Not over 3 per cent were adults.

(29) *\*Synaptomys cooperi cooperi* Baird. Taken irregularly in both water- and mouse-traps in dampish sites; eight specimens in all. There

were certain colonies, marked by runways with green cut grass in them, and found in rather open grassy spots in sphagnum bogs, which could be identified as containing this species.

(30) *\*Clethrionomys gapperi gapperi* (Vigors). Abundant and widely distributed. Thirty-six skins and one skeleton were preserved. Besides the habitats shown, some were taken on the floor of the headquarters cabin.

(31) *\*Microtus pennsylvanicus pennsylvanicus* (Ord). Locally common and quite widely distributed. Twenty-two skins and three other specimens were preserved.

(32) *\*Microtus chrotorrhinus chrotorrhinus* (Miller). Fourteen specimens in all were taken. Of these, one was in the spruce-cedar swamp, three in rock talus, and the rest at the meeting ground of swamp and hardwood ridge referred to as "swamp edge." This is a rather open site with nothing suggestive about it but the number of fallen logs, along which lay the runways of this species. Perhaps in these three sites humus is the common determinant factor, being supplied by moist leaf mould in the talus and log mould elsewhere.

(33) *\*Ondatra zibethica zibethica* (Linnaeus). Common on Pancake river, where eight were taken, and on small lakes and rivers generally.

(34) *\*Zapus hudsonius hudsonius* (Zimmermann). Mouse-trap figures would seem to indicate this species as being uncommon, but it was taken commonly in water-traps. It is to be noted that this species was characteristic of the river bank and was found in swamps. Although there is an almost complete overlap, the next species was characteristic of small streams and the high and dry sites. Seventy-four specimens (sixty-eight skins) were saved.

(35) *\*Napaeozapus insignis frutectanus* Jackson. Like the preceding, common only in water-traps. Its local distribution has already been noted. Ninety-one specimens (eighty-one skins) were saved.

(36) *\*Erethizon dorsatum dorsatum* (Linnaeus). Fairly common. One was taken.

(37) *\*Lepus americanus americanus* Erxleben. Appeared to be quite common. Three were taken. Two hares were caught in seventeen "snare nights."

(38) *Cervus canadensis* (Erxleben). Elk were released by the Ontario Department of Game and Fisheries at Searchmont in 1934. Mortality was heavy during the first winter, but a few seem to have survived.

(39) *Odocoileus virginianus borealis* (Erxleben). Fairly common. A fair number were seen by members of the party.

(40) *Alces americana* (Clinton). Common enough to make the area a good hunting ground, but reduced in number from former years, according to reports. One was seen, and a bull was heard near camp on September 16.



(41) *Rangifer caribou* (Gmelin). According to old settlers at Batchawana the Pancake area was once a fine caribou country. Fifty years ago they were the support of all residents. Moose were rare and deer unheard of. Now the deer are ousting moose from a pre-eminence of at least thirty-five years' standing, and caribou apparently are not found at all south of Sand river.

#### *Hypothetical List*

The following is a list of mammals probably occurring in the region now or in the past, but not verified by specific identification, either in collections or reports.

(1) *Mustela* sp.? J. Craig, of Mile 60, Algoma Central railway, and Louis Obat, formerly of Desbarats, and others, have taken large weasels, either *noveboracensis* or *longicauda*.

(2) *Gulo luscus* (Linnaeus). There is no record of a wolverine in the region, although they probably occurred there at one time.

(3) *Lynx canadensis* Kerr. Reports of this species were all from 100 or more miles farther north. No evidence of its occurrence in the Pancake area was obtained. Mr. Craig, who has trapped in Algoma for fifteen years, has never seen a lynx.

(4) *Sciurus carolinensis* Gmelin. One circumstantial report of a black squirrel in the Sault Ste. Marie vicinity was received.

(5) <i>Rattus norvegicus</i> (Erxleben)	}	No record of either of these introduced species was obtained.
and (6) <i>Mus musculus</i> Linnaeus		

#### REFERENCES

Anderson, R. M. (1932): Methods of Collecting and Preserving Vertebrate Animals; National Museum of Canada, Bull. 69, Biol. Ser. 18.

Brown, L. P. (1923): Fire and Its Effect on Wild Life; Jour. Mammalogy, vol. 4, pp. 195-196.

Elton, C. S. (1924): Periodic Fluctuations in Numbers of Animals: Their Causes and Effects; Br. J. Exp. Biol., vol. 2, pp. 119-163.

Hope, C. E. (1933): Two New Mammals for the Toronto Region List; Can. Field-Nat., vol. 47, p. 176.





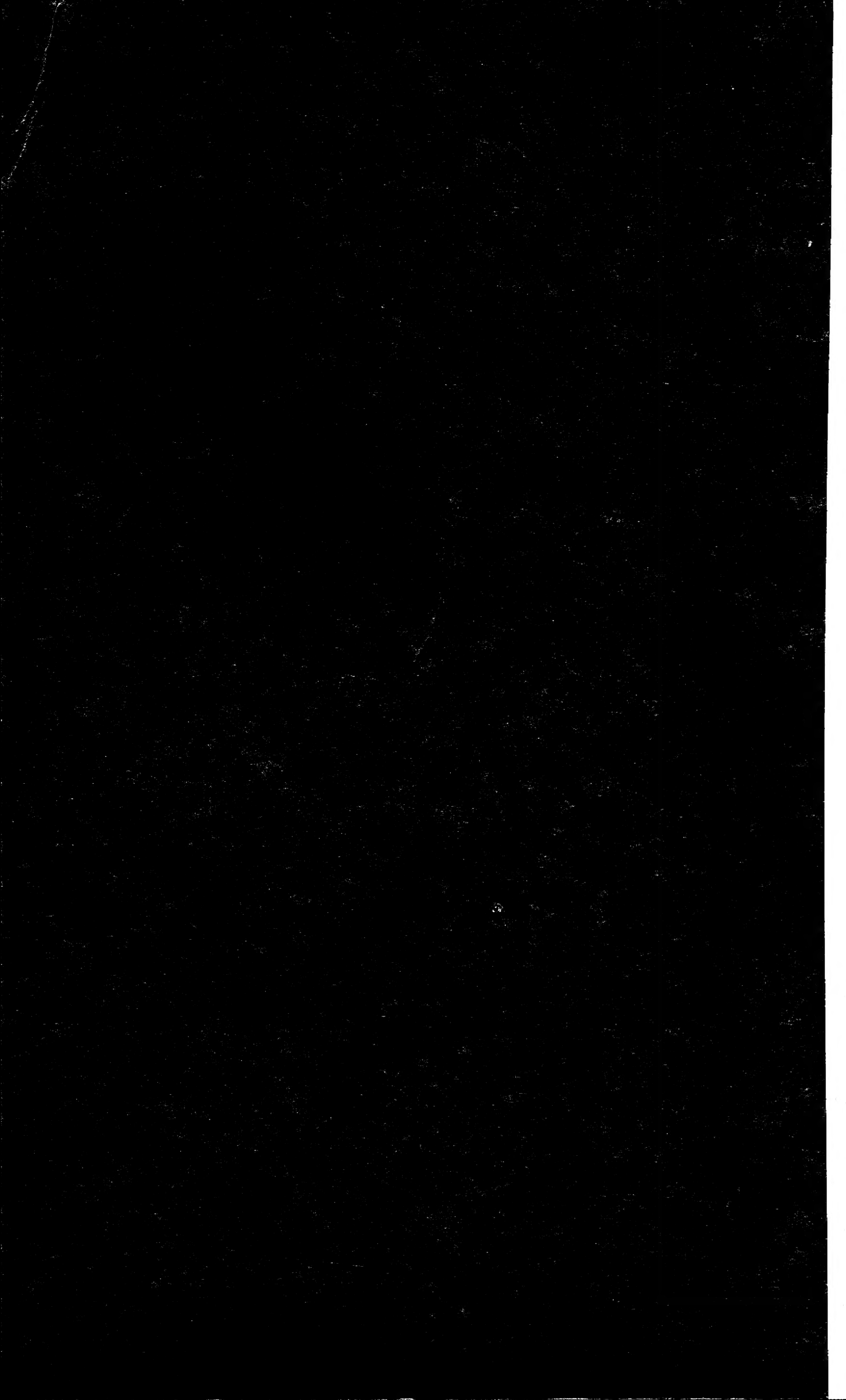


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